final environmental impact statement

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CRUDE OIL TRANSPORTATION SYSTEM: VALDEZ, ALASKA TO MIDLAND, TEXAS (AS PROPOSED BY SOHIO TRANSPORTATION COMPANY)

CHAPTER 1
DESCRIPTION OF THE PROPOSAL

DEPARTMENT OF THE INTERIOR

FINAL

ENVIRONMENTAL STATEMENT

CRUDE OIL TRANSPORTATION SYSTEM: VALDEZ, ALASKA, TO MIDLAND, TEXAS

(As proposed by SOHIO Transportation Company)

Prepared by

Bureau of Land Management
U.S. Department of the Interior

Curt Berklund

Director, Bureau of Land Management

SUMMARY

Draft ( ) Final (X) Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: Administrative (X) Legislative ( )

2. Brief Description of Action: Standard Oil Company of Ohio (through SOHIO Transportation Company) has proposed a transportation system for delivery of Alaskan crude oil from the Trans-Alaska Pipeline terminal at Valdez, Alaska, to Midland, Texas, where the oil could be distributed to refineries to the north and east. A tanker fleet would transport the crude oil 2,200 miles between Valdez and Long Beach, California. A 1,026.6-mile pipeline would transport the oil between Long Beach and Midland. Construction of three new tanker berths and dredging is proposed for the Long Beach Port. Construction of 228 miles of new pipeline, 18 pump stations, and roughly 200 miles of electric transmission line is proposed. Approximately 800 miles of existing natural gas pipeline would be abandoned and converted for the transporting of crude oil in the proposed system. The proposed system would require permits from several agencies including the Bureau of Land Management for pipeline rights-of-way across national resource lands, the Corps of Engineers for construction work in navigable waters, and the Federal Power Commission for abandonment of existing interstate gas pipeline facilities.

3. Summary of Environmental Impacts: Major oil spills by tankers between Valdez and Long Beach would result in significant adverse impacts on biotic communities, aesthetics and recreational resources in Prince William Sound and along the southern California coast; however, the occurrence of a major spill would be rare. Emissions, which would increase local air pollution slightly to moderately in the Los Angeles Air Shed, without adequate trade-offs, would result from tanker operations at the Long Beach Port and from the storage tanks at the port and the Dominguez Hills terminal. Adverse impacts on biotic communities and recreation in the Long Beach Port area would occur due to dredging and filling activities. Construction and operation of the pipeline would result in overall minor impacts on local biotic communities, soils, aesthetics, and cultural resources. Major adverse environmental impacts would occur, especially near major river crossings, in the remote event of a pipeline rupture.

4. Alternatives Considered:

   A. No action
   B. Delayed action
   C. Transport entirely or largely by tanker
   D. Alternative West Coast ports and pipeline routes
   E. Transport by railroad
   F. All-new pipeline construction in proposed corridor

5. Comments Have Been Requested From the Following:

See attached listing of Federal, state, and local entities having jurisdiction and/or expertise with regard to the proposal.

6. Date Draft Statement Made Available to CEQ and the Public:

   24 November 1976

7. Date Final Statement Made Available to CEQ:

Federal, State, and Local Agencies From Which Comments Have Been Requested: (not complete listing)

Federal Agencies

Department of Agriculture*

Department of Commerce*

Department of Defense*

Department of Health, Education and Welfare*

Department of Housing and Urban Development*

Department of the Interior
- National Park Service*
- Fish and Wildlife Service*
- Bureau of Indian Affairs*
- Bureau of Outdoor Recreation*
- Bureau of Reclamation*
- Bureau of Mines*
- Geological Survey*
- Offices of Oil and Gas
- Office of Land Use and Water Planning
- Office of Water Research and Technology

Department of Labor*

Department of State

Department of Transportation*

Advisory Council on Historic Preservation*

Energy Research and Development Administration

Environmental Protection Agency*

Federal Energy Administration

Federal Power Commission*

Marine Mammal Commission*

State Agencies

State of Alaska, Office of the Governor*
California Air Resources Board*
California Coastal Zone Conservation Commission*
California State Lands Commission*
California Public Utilities Commission*
California Department of Conservation
California Department of Fish and Game*
California Department of Transportation*
California Department of Navigation and Ocean Development*
California Energy Resources Conservation and Development Commission
California Office of Planning and Research*
California Regional Water Quality Control Board, Los Angeles Region*
California Resources Agency*
California State Department of Water Resources*
Arizona Department of Health Services*

* Denotes comments were received on the DES.

State Agencies (continued)

Arizona Water Commission*
Arizona Department of Revenue*
Arizona Environmental Planning Commission*
Arizona State Lands Department*
Arizona State Highway Department*
Arizona State Department of Game and Fish*
Arizona Planning and Zoning Commission*
Arizona Corporation Commission*
New Mexico Historic Preservation Office*
New Mexico State Lands Office
New Mexico Environmental Improvement Agency*
New Mexico Highway Department
New Mexico Corporation Commission
New Mexico State Fish and Game Department*
New Mexico State and Interstate Stream Commission
New Mexico State Planning Office*
Texas Department of Highways and Public Transportation*
Texas General Land Office*
Texas State Office of Budget and Planning
Texas Department of Health Resources
Texas Historical Commission*
Texas Industrial Commission
Texas Parks and Wildlife Commission*
Texas Railroad Commission*
Texas Water Rights Commission*
Texas Water Quality Board*
Texas Air Control Board*
Texas Public Utilities Commission
Washington Office of the Governor
Washington State Energy Office

Local Entities

City of Long Beach Port Authority
City of Los Angeles*
Los Angeles County*
Los Angeles Department of Environmental Quality
San Bernardino County, California*
Riverside County, California*
San Luis Obispo County Board of Supervisors, California
Yuma County Health Department, Arizona
Maricopa County Board of Supervisors, Arizona
Pima County Board of Supervisors, Arizona
County of Dona Ana, New Mexico
County of Grant, New Mexico
County of Hidalgo, New Mexico
County of Luna, New Mexico
County of Midland, Texas*
City of Midland, Texas

Canada

U.S. Consulate General, Vancouver, B.C.
Environmental Protection Service, Vancouver, B.C.
Canadian Consulate General

Other Interested Private Groups and Individuals

DRAFT

ENVIRONMENTAL STATEMENT

CRUDE OIL TRANSPORTATION SYSTEM: VALDEZ, ALASKA TO MIDLAND, TEXAS

(As Proposed by SOHIO Transportation Company)

CHAPTER 1

DESCRIPTION OF THE ACTION

Prepared by

Bureau of Land Management
U.S. Department of the Interior

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ADDITIONAL STUDIES MADE FOR THIS DOCUMENT*

Air Quality Impact Assessment of Pipeline Abandonment and Conversion
Air Quality Impact of the Proposed SOHIO Tanker Fleet on Port Valdez, Alaska
Final Report BLM-SOHIO Project, Volume 5, Air Quality
Final Report BLM-SOHIO Project, Volume 8, Energy Supply/Demand
Midland Air Quality Study
Moving Source Emissions Study

*These technical studies are available on request, while supplies last, at the California State Office, Bureau of Land Management, Room E-2841, 2800 Cottage Way, Sacramento, California 95825. The studies also are on file at selected libraries and clearing houses.

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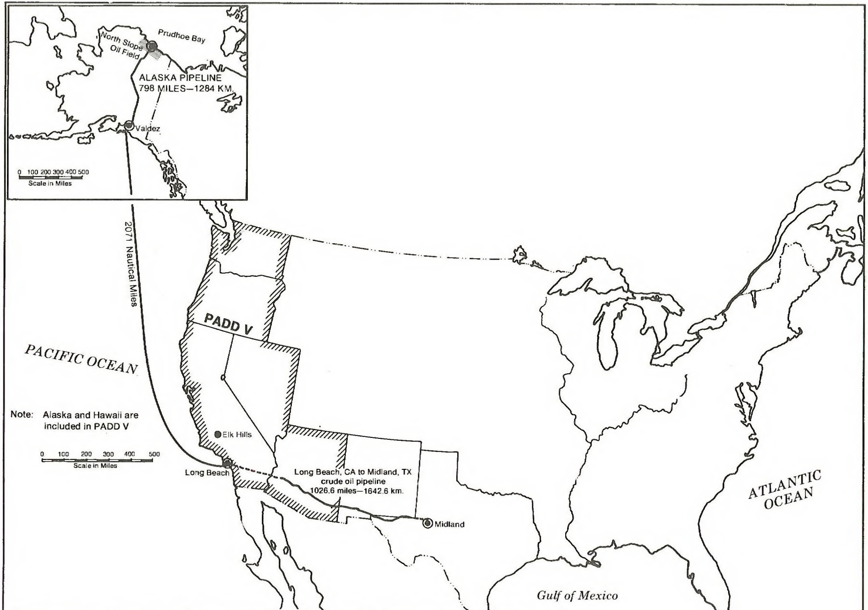


Figure 1 Route of proposed SOHIO oil transportation system

CHAPTER 1

DESCRIPTION OF THE PROPOSAL

1.0 INTRODUCTION AND GENERAL PROJECT DESCRIPTION

SOHIO Transportation Company of California, a subsidiary of Standard Oil Company of Ohio (SOHIO), is proposing a common carrier crude oil transportation system to transport 700,000 barrels per day of North Slope (Prudhoe Bay) Alaskan oil to the midwestern and eastern portions of the United States. In general, this oil is characterized as moderate- to high-sulfur, relatively heavy crude.

The transportation system would begin at a proposed new terminal at Port Valdez, Alaska, where the first Prudhoe Bay crude oil is expected to arrive in 1977 via the Trans-Alaska pipeline. Proposed is transportation of SOHIO's 54 percent share of the projected 1978 Prudhoe Bay output, a share expected to amount to 700,000 barrels per day (bbl/d). Transportation is proposed to be by tanker, using the most feasible direct route down the West Coast (discussed further in Section 1.1.1.1) to a proposed new unloading facility at Pier J in Long Beach, California. Two hundred thousand barrels per day of this crude oil would be absorbed for refineries in the Los Angeles area for California markets.

Eleven tankers would constitute the proposed SOHIO Transportation Company fleet. Some of these tankers are presently in service; others are under construction. Four would be tankers of the 165,000 deadweight ton (DWT) class. All would be subject to regulations of the Merchant Marine Act of June 5, 1920 (USC Title 46, Sec. 883), commonly known as the Jones Act, and applicable state and Federal laws.

From Pier J the crude oil would be transferred through a new 48-inch pipeline for a distance of 8.9 miles to the Dominguez Hills terminal. This route is discussed in detail in Section 1.1.1.1.

The Dominguez Hills terminal would be the initiating pump station for the transferring of up to 500,000 barrels of surplus crude oil per day through the proposed common-carrier line to Midland, Texas. An engineering evaluation, including geotechnic hazards, of the proposed pipeline and facilities appears in Appendix A1.0. Maps 1.1.1-1 through 1.1.1-12 in Attachment 1 illustrate the pipeline and system.

At the Dominguez Hills terminal, the applicant proposes to move the remaining 200,000 barrels (of the original 700,000 barrels per day) of crude oil through a new pipeline that would tie into the existing Four Corners crude oil line for distribution to California refineries. Details of this line are in Section 1.1.1.1.

Also, from Dominguez Hills, new pipeline would be constructed (through Redlands Pump Station) to Beaumont, California, where the line would connect to a 120-mile-long natural gas pipeline belonging to Southern California Gas Company. This line extends to slightly east of Desert Center, California. New pipeline would extend from that point across the Colorado River and again tie into existing natural gas pipeline (belonging to El Paso Natural Gas Company) at Ehrenberg, Arizona. This line extends to near the proposed Livingston Pump Station where new pipeline would carry the product to another existing El Paso natural gas line about 34 miles east of Livingston. From there the existing line would carry the oil to Jal, New Mexico. At that point, new line would transport the oil to Midland, Texas. Total length of the pipeline from Dominguez Hills to Midland, Texas, would be 1,026.6 miles.

The natural gas lines to be utilized would require conversion from westward-moving natural gas to eastward-moving crude oil. Eighteen pump stations

would be necessary to move the oil along the route. Transfer stations would be located in Jal, New Mexico, and Ector County, Texas, to accommodate existing tank farms there.

From the Midland area, crude can be moved north into the Midwest, south to the Gulf Coast, or east to the eastern Texas producing area for connection with other northbound and southbound lines.

The total pipeline capacity for crude oil coming out of the Midland area is more than 2 million bbl/d. While these systems are essentially running at capacity today, projected declines in Permian Basin crude oil and natural gas production suggest that approximately 400,000 bbl/d of idle capacity and the idling of a second natural gas line, may exist at about the time the proposed pipeline is scheduled to be completed.

The proposed system could be expanded to accommodate larger volumes if and when a larger surplus developed. The existing natural gas line proposed to be used for this project is nearly all 30-inch diameter pipe which would support a 500,000 bbl/d crude transportation rate. The section of new pipeline in the proposed system would be a 42-inch diameter pipe which could accommodate 1 million bbl/d with the construction of additional pump stations and the abandonment of the second natural gas pipeline. Therefore, if and when the need for expansion occurred, it could be accomplished by adding another tanker berth, more storage tanks, and additional pump stations, and making pipeline alterations to tie in the second natural gas pipeline. Should Permian Basin production declines not occur as rapidly as expected, expansion of the capacity of the system could still be accomplished without new pipeline construction. It should be recognized that a new Environmental Statement and additional permits would be required as prerequisites to such expansion.

At this writing the expected cost of the proposed project, including all over-water construction at Pier J in Long Beach and all other related

construction to and including that in Midland, Texas is expected to be $555 million. The construction of the tanker fleet is not a part of this proposal, and therefore, the coast has not been identified.

Significant Federal actions

Applications have been filed with the Bureau of Land Management for rights-of-way across Federal lands in California, Arizona, and New Mexico for pipeline conversion and new construction. Because of these applications, the Bureau of Land Management was assigned lead agency status in preparing this Environmental Statement.

The U.S. Army Corps of Engineers has applications pending for permits to work in navigable waterways, involving dredging and construction at the Port of Long Beach and several stream crossings. The Corps of Engineers also must provide easements across U.S. Department of the Army lands at Fort Bliss.

The Federal Power Commission (FPC) must act on application for abandonment of existing interstate natural gas pipelines which are a part of this proposal. The FPC staff has assisted in the preparation of those sections of this statement dealing with the abandonment of the El Paso gas transmission pipeline. This and other authorizing actions are shown in Section 1.3 of this chapter.

1.1 BACKGROUND IN BRIEF

On 25 October 1975 SOHIO Transportation Company submitted a proposal to improve the energy supply-demand balance in the major regions of the United States by the development of a crude oil transportation system from Valdez, Alaska to Midland, Texas. A major surplus of crude oil is expected to develop on the West Coast with the commencement of North Slope (Alaska) crude production. Table 1.1-1 illustrates crude oil supply for 1974 and

estimates for 1978 and 1982 as furnished by the applicant for Padd V, the fifth Petroleum Administrative Defense District (see the frontispiece, Figure 1). At the same time, the remainder of the United States is expected to be increasingly dependent upon large volumes of foreign imports, volumes well in excess of the total North Slope production. Construction of a pipeline capable of moving large volumes of crude oil to crude-deficient areas east of the Rocky Mountains is proposed both to relieve the prospective regional crude supply/demand imbalance and to reduce dependence on foreign crude imports through full utilization of domestic crude production (Figure 1.1-1). At present, no such west-to-east crude oil transportation link exists.

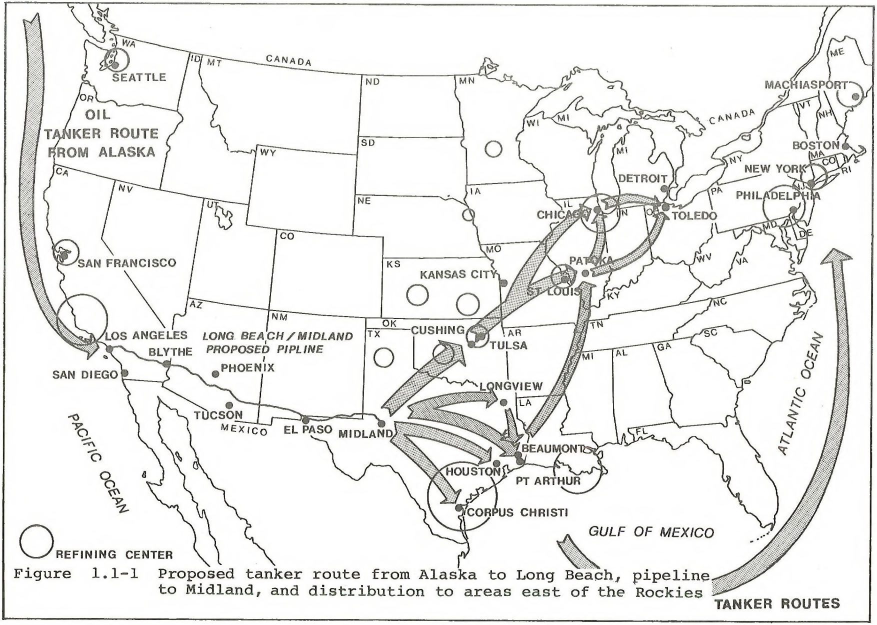


Figure 1.1-1 Proposed tanker route from Alaska to Long Beach, pipeline to Midland, and distribution to areas east of the Rockies

Table 1.1-1

Estimated Crude Supply PADD V[a]

PARAMETER	Year 1974	1978	1982
Crude processed	1,900	2,475-2,550	2,800-2,900
Crude source			
California production	890	850	750
Alaskan Cook Inlet	190	150	150
Other U.S. districts	45	NA[b]	NA
Canadian imports	190	100-0	NA
Offshore			
Persian Gulf and other sour crude	310	NA	NA
Indonesian and African sweet crude	275	450-550	500
New California production			
Offshore	NA	0-75	350-400
Elk Hills	NA	100-250	NA
Alaskan North Slope		1,200	1,800-2,000
Total crude available for processing	1,900	2,850-3,075	3,600-3,800
West Coast crude surplus		300-600	790-900

Source: Williams Brothers Engineering Company.

[a] Thousand barrels per day.

[b] Not available or not applicable.

1.1.1 Detailed definition of project

1.1.1.1 Route, including tanker and pipeline characteristics

Sea Leg

While taking on crude oil at the Valdez, Alaska, terminal now under construction, tankers will off-load tank cleaning slops (containing hydrocarbons) into facility tanks for water treatment. Crude oil will be transferred either directly from the trans-Alaska pipeline or from 18 enclosed 510,000 barrel-capacity storage-surge tanks equipped for vapor recovery. The construction of this terminal was analyzed in the Trans-Alaska Pipeline System Environmental Impact Statement (USDI, 1972). Oil would be loaded through gravity flow systems from storage tanks in place at Valdez and would be carried through steel loading arms rather than by hoses to minimize incidence of leaks and spills. The down-coast voyage would take five days from Valdez to Long Beach. Vessels would be under control of the Vessel Traffic System (VTS) from Valdez outbound into Prince William Sound where the most direct southerly course, approximately 2,200 statute miles, to Long Beach would be followed. The normal rhumb line course from Prince William Sound to Long Beach is 146° oblique to 326°.

Included in the proposed SOHIO tanker fleet are vessels owned by Keystone Shipping Company and Interstate and Ocean Transport Company which are leased by SOHIO Transportation Company. These vessels and their characteristics are listed in Table 1.1.1.1-1. As indicated earlier, SOHIO has proposed that a tanker mix of 11 vessels be used to transport 700,000 bbl/d of Alaskan crude oil to the West Coast. Bureau of Land Management evaluation indicates a mix of from 13 to 15 tankers would be necessary. Subsequent analyses in other chapters of this ES therefore are predicated on a mix of 14 vessels. To date the applicant has not indicated that transportation of the crude oil will be restricted to the SOHIO fleet. This assumpion of use of 14 tankers is based on a combination of maintained time required and

delays caused by weather or other unexpected events. Results of a tanker traffic study conducted for the Bureau of Land Management by ERT, Inc. indicate no difference in the final outcome of the tanker-hazard analysis whether 11 or 14 tankers are used. The tanker traffic study is presented in Appendix A1.1.1.1-A.

Table 1.1.1.1-1

Tanker Data: Crude Oil Delivery System

Valdez, Alaska, to Long Beach, California[a]

NO. OF VESSELS	Lessee	DWT	Segregated Ballast[b]	Inerting	Low-Sulfur Fuel Capacity
4	SOHIO	165,000	35%[b]	yes	yes
3	SOHIO	118,000	35%[c]	yes	yes
4	SOHIO	80,000+	20%[d]	no	yes

Source: SOHIO Transportation Company of California, 1976.

[a] This table represents an assumed tanker mix based on Port facilities design at Valdez, Alaska, and Long Beach, California. The mix excludes those vessels of less than 70,000 DWT and assumes the most reasonable mix based on distance, economics, and standards to be imposed at Long Beach. See Appendix A1.1.1.1 for discussion of inert gas system.

[b] 35% is the normal deadweight ballast carried by tankers while at sea. This represents 100% of the segregated ballast.

[c] SOHIO 118,000 DWT tankers will have double hulls to reduce the possibility of piercing the cargo hull.

[d] Tanker would take on 20% of gross weight tonnage to adjust to 35% ballast (nonfluctuating) before leaving port and would not adjust until after leaving port.

As noted earlier, vessels available for the Alaskan crude oil trade are limited to those which meet the Jones Act requirements or which are capable of meeting these requirements. The following vessels presently operating, under construction, or planned meet Jones Act requirements (Table 1.1.1.1-2). Only vessels which can be accommodated in the proposed facility are considered.

Table 1.1.1.1-2

Projected Alaskan Crude Oil Tanker Fleet

LESSEE/OPERATOR	Vessel Name	Year Constructed	Size (DWT)
	In Service		
SOHIO	Joseph D. Potts	1970	81,000
SOHIO	SOHIO Intrepid	1971	80,700
SOHIO	SOHIO Resolute	1971	80,600
SOHIO	SOHIO (name unknown)	1971	80,600
SOHIO	Prince William Sound	1976	118,000
	Under Construction or Planned		
SOHIO	Sun Hull #668	1977	118,000
SOHIO	Sun Hull #669	1977	118,000
SOHIO	Avondale Hull #2295	1977	165,000
SOHIO	Avondale Hull #2296	1977	165,000
SOHIO	Avondale Hull #2297	1978	165,000
SOHIO	Avondale Hull #2298	1978	165,000

Source: SOHIO Transportation Company, 14 October 1976.

The total anticipated capacity of the 11 SOHIO vessels which could utilize the facility is 1,336,900 DWT. This is equivalent to approximately 10,026,750 barrels of oil. If one makes the assumption that each of the vessels has the same cruising speed, each would be capable of making 23 round trips between Valdez, Alaska, and Long Beach, California, each year giving a total crude oil transport capacity of 230,615,250 bbl/yr. However, calculations made for this document (Appendix A3.1.6.1, Table A3.1.6.1-8) indicate the annual cargo capacity would be 231.5 million bbl/yr due to varying cruising speeds of the 11 tankers.

Of the stated 1,336,900 DWT of shipping capacity, four vessels have a segregated ballast of 20 percent of deadweight and seven have a segregated ballast of 35 percent of deadweight.

It is expected that the SOHIO proposal would alter the mix of tankship types which call at Port Valdez. Table 1.1.1.1-3 shows a breakdown of the fleet of tankers expected to call at the Valdez Trans-Alaska Pipeline System (TAPS) terminal.

Table 1.1.1.1-3

Expected Composition of the TAPS Tanker Fleet

SEGREGATED BALLAST[a]	Lessee	Deadweight Tonnage X 10,000			
		50	70-80	115-125	≥165
<20 percent	Non-SOHIO	15	12	1	0
≥20 percent	Non-SOHIO	4	5	4	5
≥20 percent	SOHIO	0	4	3	4[b]

Source: ERT, Inc., 1976

[a] Percent of deadweight.

[b] Currently under construction for SOHIO lease, but expected to be used in TAPS service by another operator in the event the SOHIO proposal is not implemented.

The tankers would travel approximately 250 to 300 miles offshore of southern Alaska and British Columbia. Off the coast of Washington and Oregon, the tankers would be some 300 to 320 miles offshore until they reach the northern California coast where they approach to within 140 to 160 miles. This distance narrows offshore at Cape Mendocino to within 80 to 100 miles and to within 50 miles offshore of Point Arena and the San Francisco Bay Golden Gate. An exception to this is that the route would be 20 to 25 miles westerly of the Farallon Islands Wildlife Refuge. The route passes within

40 to 50 miles offshore of Monterey, within 30 to 40 miles offshore of the Big Sur coast, Estero Bay, and within 20 miles offshore of Point Conception prior to entering the Channel Islands area off Santa Barbara.

The vessel master determines the course which is dependent on weather, traffic, or other conditions prevailing at the time on any given voyage. In the Channel Islands area, the tanker route could vary from 10 miles or less, to 30 miles offshore during the approach to San Pedro Bay and the Port of Long Beach. In the Port of Long Beach, tugboats would be required to assist in docking the tankers. It will require 2 tugs to dock an 80,000 DWT tanker, 3 tugs to dock a 120,000 DWT tanker and 4 tugs to dock a 165,000 DWT tanker. Normally, vessels would be in port two days to off-load. The return to Valdez would take another five days. Two days would be needed there to load. A complete round trip would take approximately 14 days.

There is an extensive discussion of tanker design features (e.g. inert gas systems), and tanker operations (loading, ballasting, purging, etc.) in Appendix A1.1.1.1. The basic features are the following:

1. Ballast water is put in tankers after cargo discharge to maintain stability and to submerge the rudder and propeller. There are safety and anti-pollution benefits in keeping oil and ballast separate on tankers. And this is possible with segregated ballast tanks.

2. Inert gas systems allow maintenance of near oxygen-free atmosphere in tanks. The benefits are reduced danger of explosion and corrosion. Purging is a repeated flushing to remove hydrocarbon vapors from tanks and thereby lower the danger of fire in case of rupture of a tank in a collision. Purging is difficult at any time other than cruising at sea.

3. Some SOHIO tankers will have permanently installed tank cleaning equipment which uses jet sprays. This equipment is more automated and produces less static electricity than results from conventional water cleaning of crude oil tankers. Inerted tankers need to clean tanks less often.

4. There are collision avoiding radar and Loran-C navigational aids on SOHIO tankers. Segregated ballast tanks also offer some protection against spillage from a damaged hull.

5. Cargo will be taken on and ballast discharged at Port Valdez. The reverse would occur at Long Beach. All other operations are optional. There are a set of procedures for loading and unloading that are determined by provisions of the terminal and by the U.S. Coast Guard.

An oil spill contingency plan covering the transportation route from Valdez to the Hinchinbrook entrance was developed for the Trans-Alaska Pipeline System. Oil spill emergency operations on the high seas are under the jurisdiction of the U.S. Coast Guard. The U.S. Coast Guard jurisdiction for oil spill cleanup did not change with the establishment of the 200-mile limitation on fishing. It is still 12 miles. There is no control outside of the 12-mile limit, but the Coast Guard will help in cleanup if the shoreline is threatened. In Prince William Sound, the limit is 12 miles, but the Coast Guard tries to help over distance of up to 50 miles. The Pollution Preventive Act of 1968 extended this distance to 100 miles offshore for certain purposes.

Port of Long Beach to Midland (pipeline route)

SOHIO Transportation Company has proposed that an unloading terminal be constructed at the Port of Long Beach. The terminal would consist of three fixed mooring berths, each capable of handling approximately 125,000 bbl/hr. It is initially anticipated that this terminal would accommodate three vessels up to approximately 165,000 DWT. As noted, a total of 700,000 bbl/d of crude oil is proposed to be accommodated through the Port facility with 500,000 bbl/d of the total continuing through the pipeline system.

The pipeline portion of the project can be defined by considering right-of-way required in counties crossed. Table 1.1.1.1-4 describes the permanent right-of-way as being 50 feet wide. The applicant has proposed a temporary right-of-way of 100 feet for construction purposes; however, there are areas along the route where it would be impossible to obtain these widths because of heavy congestion, such as from Pier J to the Dominguez Hills terminal, and through croplands. Where new pipeline maintenance roads would be required, the normal width would be approximately 12 feet of unpaved surface. Areas where these roads would be located have not been determined. The center line alignment had not been completely established as of this writing.

Table 1.1.1.1-4

Pipeline Mileage/Acreage Summary

PIPELINE SEGMENT (From/To)	New Pipe[a] 30-inch	New Pipe[a] 42-inch	New Pipe[a] 48-inch	Existing Pipe[a] 30-inch	Existing Pipe[a] 26-inch	Total Miles	Total Acres[b]
Pier J/ Dominguez Hills			8.9			8.9	53.4
Dominguez Hills/ Redlands		72.5				72.5	435.0
Redlands/ Indio		11.0		60.5		71.5	429.0
Indio/ Desert Center				41.7		41.7	250.2
Desert Center/ Ehrenberg		37.1		18.2		55.3	331.8
Ehrenberg/ Livingston				17.7		17.7	106.2
Livingston/ Gila	34.2			50.6		84.8	508.8
Gila/ Casa Grande				50.6		50.6	303.6
Casa Grande/ Coolidge				49.8		49.8	298.8
Coolidge/ Black Mountain				20.7		20.7	124.2
Black Mountain/ Redington				43.2		43.2	259.2
Redington/ Cochise				60.5		60.5	363.0

[a] Number of miles.

[b] Acreage calculations based on 50-foot right-of-way which would be equivalent to 6 acres per linear mile.

Table 1.1.1.1-4 (Continued)

PIPELINE SEGMENT (From/To)	New Pipe[a]			Existing Pipe[a]		Total Miles	Total Acres[b]
	30-inch	42-inch	48-inch	30-inch	26-inch		
Cochise/ Lordsburg				43.6		43.6	261.6
Lordsburg/ Deming				48.5		48.5	291.0
Deming/ Anthony				71.1		71.1	426.6
Anthony/ El Paso				33.6		33.6	201.6
El Paso/ Guadalupe				72.8		72.8	436.8
Guadalupe/ Pecos River				59.1	2.1	61.2	367.2
Pecos River/ Midland		73.1		45.5		118.6	711.6
Total						1,026.6	6,159.6

Details of California route

The proposed pipeline would require approximately 244.4 miles of permanent right-of-way in California. The line traverses Los Angeles, San Bernardino and Riverside counties, occupying approximately 1,477 acres of 50-foot right-of-way. The applicant has proposed to construct a terminal at Dominguez Hills, but has not submitted a complete description of the terminal facilities to be located there. A proposed 16-inch pipeline, which would connect with the existing 16-inch Four Corners crude oil line, would leave the Dominguez Hills terminal on the south side, cross Del Amo Boulevard, then parallel Del Amo on the south side for 1.5 miles west. The tie-in to the Four Corners line is at a point close to where the Four Corners line ties off into another 16-inch distribution line and where the original 16-inch line continues on to further distribution to other refineries in the basin. By increasing the pressures of this line, the line

can accommodate the 200,000 bbl/d SOHIO crude for distribution to the Los Angeles Basin refineries. Thus, the Four Corners line is the line which will be used for California refinery distribution and is integral to the implementation of the applicant's proposal.

The proposed route to the Dominguez Hills terminal would begin with new 48-inch pipeline at Pier J and proceed north along the west side of the Los Angeles River flood control channel to a point 0.5-mile north of the San Diego Freeway where the pipeline would intersect the Southern Pacific Railroad tracks. At this point, the pipeline would follow the Southern Pacific Railroad tracks in a northwesterly direction for approximately 0.2 mile where it would cross the tracks. It would then proceed in a northerly direction for 0.4 mile where it would intersect the Compton Creek Flood Control Channel. It would follow this channel on the southern right-of-way in a northwesterly direction for approximately 1 mile, turn due west for about 0.5 mile crossing under Alameda Boulevard, where it would enter the Dominguez Hills terminal area. This 69-acre-site is located on the east side at the foot of the Dominguez Hills, 8.9 miles from Pier J as illustrated on Maps 1.1.1-1 through 1.1.1-12 in Attachment 1.

(It should be noted that a Draft Environmental Impact Report (EIR) prepared for the State of California by the Port of Long Beach and California Public Utilities Commission specified a Hynes site for the inland terminal. As of this writing, the applicant does not propose to use the Hynes site, and the Final EIR will specify the Dominguez Hills site. There is no relationship between the California EIR and this Federal ES. However, some of the same data sources were used, and there was some exchange of information during the preparation of the documents. The scope of the two documents is different, in that the State of California considered only those project increments within its boundaries.)

A new 42-inch pipeline would leave the proposed Dominguez Hills terminal and proceed due east for 0.5 mile to the Dominguez Flood Control Channel. It

would turn southeast for about 0.1 mile and would turn due east, crossing under the Compton Creek Flood Control Channel where it would proceed 0.66 mile to cross over the Los Angeles River flood control channel. There it would continue north along the east side of the Los Angeles River flood control channel to its confluence with the Rio Hondo where it would continue along the east side of the Rio Hondo to the Los Angeles River flood control basin at Whittier Narrows (see Maps 1.1.1-1 through 1.1.1-12 in Attachment 1).

The 42-inch pipeline would continue along the downstream toe of the flood control basin dam, crossing the San Gabriel River to the San Jose Creek where it would proceed along the creek for approximately 37 miles.

The pipeline would leave the San Jose Creek area in a southeasterly direction where it would then cross the Puente Hills south of Diamond Bar and enter San Bernardino County approximately 35 miles from Dominguez Hills terminal. The proposed alignment then proceeds easterly to the Redlands Pump Station, shown on Maps 1.1.1-1 through 1.1.1-12 in Attachment 1.

The northwestern corner of Riverside County would be crossed before the pipeline reenters San Bernardino County. The route would continue in a generally easterly direction utilizing existing electric power transmission corridors, where such corridors are available. The route would pass north of the Jurupa Mountains and south of the cities of Fontana and Rialto. The pipeline would cross the Santa Ana River south of Colton, continuing north of the city of Loma Linda and turning southeast to follow San Timoteo Wash into San Timoteo Canyon, thence again into Riverside County. Approximately 83.5 miles from Dominguez Hills terminal, the new pipeline would connect to the existing 30-inch natural gas pipeline of the Southern California Gas Company, approximately 4 miles west of Beaumont, California.

From Beaumont, the existing natural gas pipeline continues across Riverside County between the San Bernardino Mountains and San Jacinto Mountain range

and across the northern end of Coachella Valley. It proceeds easterly, south of the San Bernardino Mountains and Joshua Tree National Monument and north of the Salton Sea. The pipeline proceeds south through the Chuckwalla Valley and south of the Ford Dry Lake. At this point, which is 19 miles east of Desert Center, the existing gas pipeline would tie into 37.1 miles of new 42-inch line. This line would continue to the Colorado River, crossing under the river, exiting California, and extend 5.6 miles into Arizona to the proposed Ehrenberg Pump Station (Maps 1.1.1-1 through 1.1.1-12 in Attachment 1).

Details of Arizona, New Mexico, and Texas route

At the Ehrenberg Pump Station, the pipeline would connect with an existing 30-inch El Paso Natural Gas Company pipeline. The El Paso Natural Gas Company 30-inch gas pipeline extends to a point near the Livingston Pump Station where the existing 30-inch line would connect to 34.2 miles of new 30-inch pipeline. The new 30-inch line would connect to existing 30-inch El Paso Natural Gas pipeline near the Gila, Arizona, Pump Station and continue to a point near Guadalupe, Texas, where it would connect to a 2.1-mile section of existing 26-inch El Paso gas pipeline. (Installation of longer radius bends in the top and bottom of this 2.1-mile segment is proposed in order to permit free passage of a dual-diameter scraper pig. Scraper traps also would be installed within this pipeline segment at Guadalupe Pass. See Attachment 1, Changes and Additions page, for details of scraper launchers and receivers.) The existing 26-inch line connects to existing 30-inch line near Guadalupe Pass, Texas, and ends near Jal, New Mexico. A new section of 73.1 miles of 42-inch line would be constructed from a point near Jal, New Mexico, to a point near Midland, Texas.

The proposed pipeline would traverse approximately 782 miles of permanent right-of-way through Arizona, New Mexico, and western Texas, occupying approximately 4,692 acres of 50-foot right-of-way. This route segment traverses Yuma, Maricopa, Pinal, Pima, and Cochise counties in Arizona;

Hidalgo, Grant, Luna, and Dona Ana counties in New Mexico; El Paso, Hudspeth, and Culberson counties in Texas, and reenters New Mexico through Eddy and Lea counties. It reenters Texas through Winkler and Ector counties and terminates in Midland County.

1.1.1.2 Facilities

The port facility would be located in San Pedro Bay at the Port of Long Beach. The port facility would provide water depth, maneuvering space, and three berths for unloading crude oil tankers. At each berth the tankers would connect to mechanical arms which would permit transfer of crude oil through metered pipelines to storage tanks onshore. Suitable utilities and support facilities would be provided to service the tankers while moored in berth, including tanker fuel. Also at the terminal, six 615,000-barrel tanks would be constructed (Figures 1.1.1.2-1, 1.1.1.2-2, and 1.1.1.2-3).

The Port of Long Beach would be required to extend its Pier J facilities to include three tanker berths capable of accommodating tankers from 70,000 to 165,000 DWT. This would require dredging of approximately 2.5 million cubic yards of bottom sediments with 700,000 cubic yards to become part of the new breakwater. The remaining spoils would be ocean-dumped at an approved EPA disposal site offshore of Long Beach (see Section 1.2.2.1); the applicant has not advised if permits for dumping have been approved.

An impervious breakwater would also be constructed. The breakwater would require 1.5 million tons of rock from a Santa Catalina Island quarry site. The rock would be transported by barges and placed to protect the berths on the ocean side facing the Queen's Gate entrance to San Pedro Bay.

The berthing area would be open on either side behind the permanent breakwater to facilitate tidal exchange within the bay. The land connection with the berthing area would be through a 4,700-foot concrete trestle supported by piles extending from Pier J. This trestle would carry three

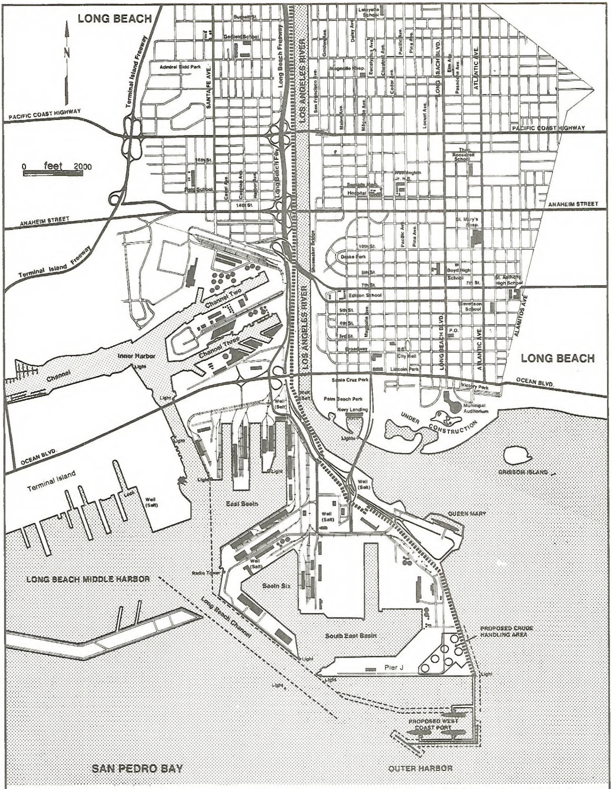


Figure 1.1.1.2-1 West Coast crude oil-handling facilities located at Port of Long Beach

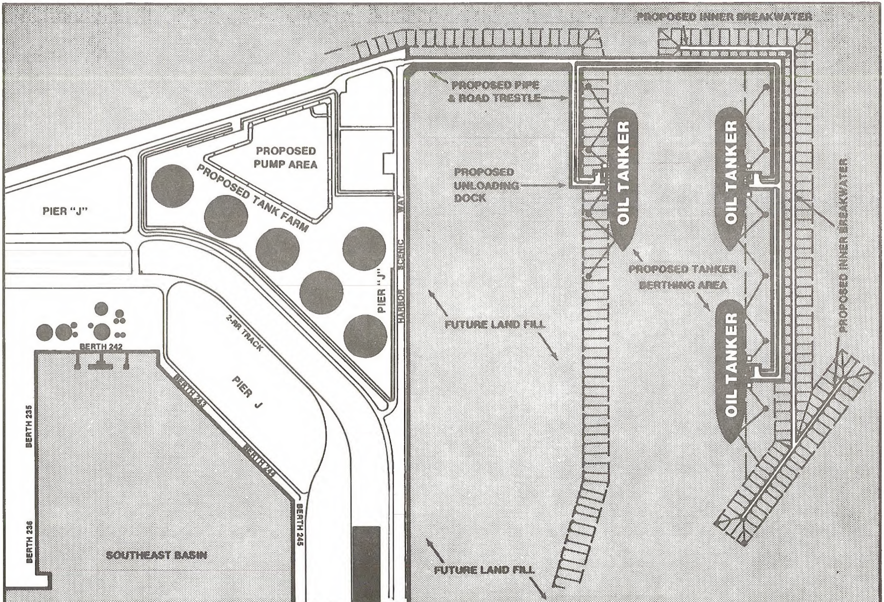


Figure 1.1.1.2-2 Long Beach Port and proposed support facilities

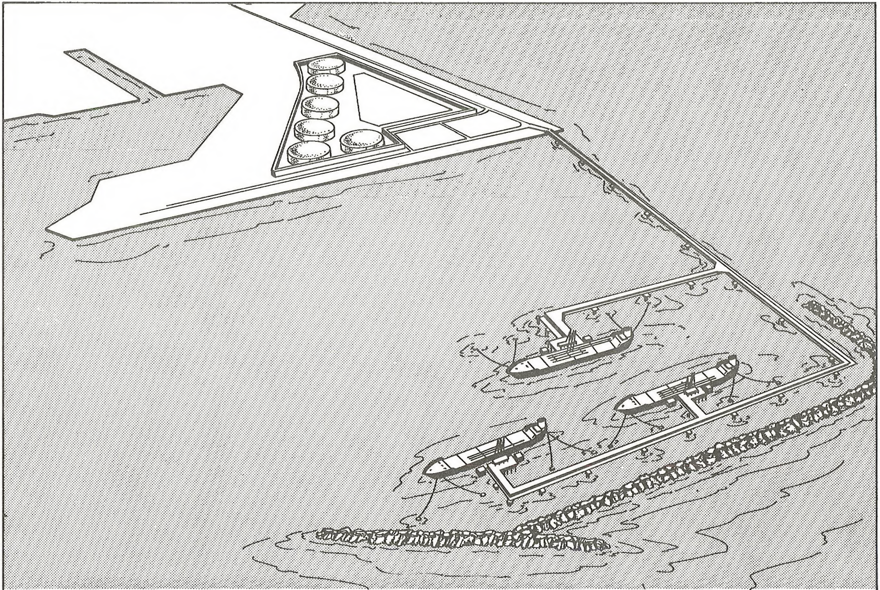


Figure 1.1.1.2-3 Long Beach Port facilities, proposed tanker berths, and tank farm

48-inch pipelines from the off-loading facilities of the berths to the 42-acre tank farm where the six 615,000-barrel tanks would be located. These tanks would be 66 feet high by 271 feet in diameter.

At the Dominguez Hills terminal, initiating pump station facilities would include two 615,000-barrel storage tanks, booster pumps, and metering equipment for deliveries to California refineries and to the proposed pipeline system. Figure 1.1.1.2-4 illustrates terminal facilities that typify those proposed for the Dominguez Hills terminal.

The Jal, New Mexico, transfer station would deliver a maximum of 168,000 bbl/d to the Texas/New Mexico tank farm, and the one in Ector County, Texas, would deliver a maximum of 204,000 bbl/d to the Exxon tank farm and a maximum of 160,000 bbl/d to the Shell Oil Wight Pump Station. These transfer stations would include pressure regulation and metering facilities.

At the Midland, Texas, terminal facility, four 500,000-barrel floating-roof storage tanks would be erected to receive crude oil from the pipeline facility (Figure 1.1.1.2-5). These tanks are 245 feet wide and 66 feet high. This terminal also would include metering and pumping installations to make deliveries of crude oil to other interconnecting pipelines. The Midland terminal would be provided with fire-fighting, control, and communications systems, and would occupy 70.9 acres.

A total of 107 main-line valves would be included with the main pipeline system, in addition to the valves located within the pump stations.

The 18 pump station locations, their horsepower requirements (see Table 1.2.3.2-24), and the electrical power sources are dictated primarily on the basis of the limitations of hydraulic design. The pump stations would be unattended and would be equipped with the required control and communication systems to monitor and control their operations.

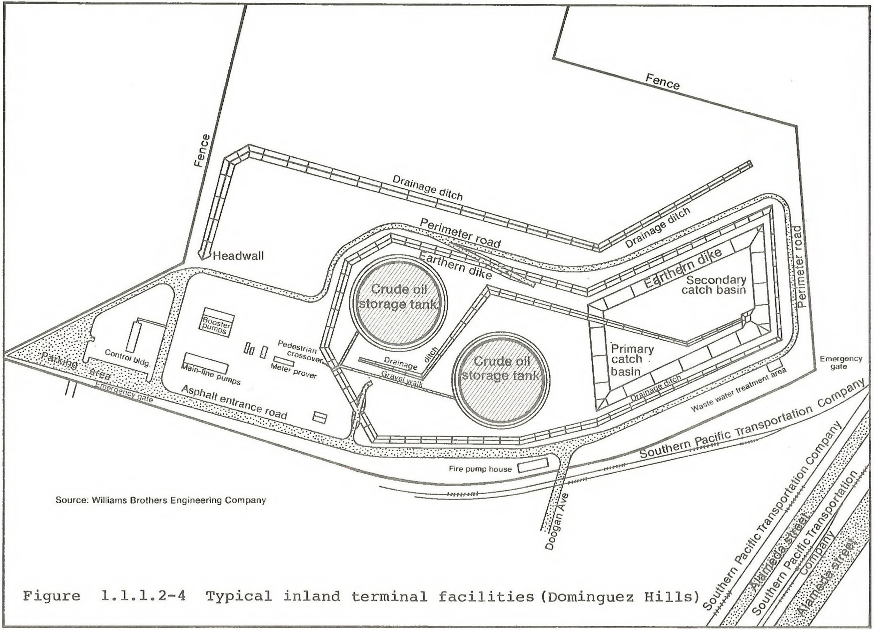
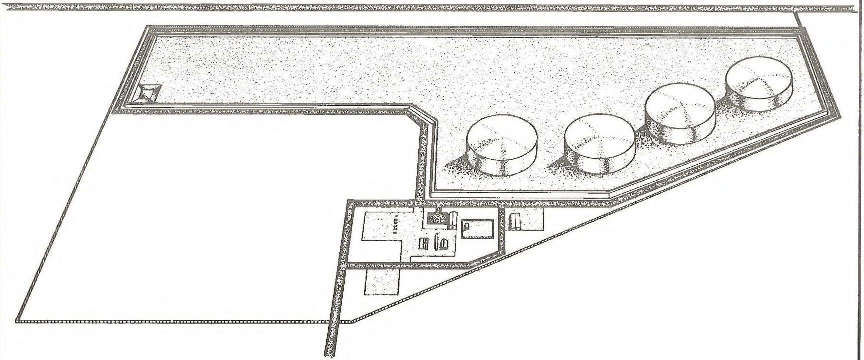


Figure 1.1.1.2-4 Typical inland terminal facilities (Dominguez Hills)



Source: Williams Brothers Engineering Company

Figure 1.1.1.2-5 Midland terminal facility and floating-roof storage tanks

For control of the crude oil system, one control system would monitor the West Coast port and terminal operations. A second control system would monitor and control pipeline pump stations, the Jal and Ector transfer stations, and certain Midland terminal operations, using a master control center in downtown El Paso, Texas. Each control system would have remote-control units at the terminals and pump stations to allow the control center dispatcher to monitor crude oil movement and the protective devices.

The proposed communications system would be based on a microwave system with spurs connecting to each terminal, pump station, and the Redlands maintenance location. Circuits would provide point-to-point voice, teleprinter, and data transmission channels, and mobile radio systems would complement the system for essential vehicles in each area.

Maintenance bases at the terminals and at Redlands, Ehrenberg, Casa Grande, Lordsburg, and El Paso would comprise the focal points for maintenance and repairs throughout the system. These bases would be equipped for handling scheduled maintenance, major and routine repairs on the pump stations and pipeline, and major repair jobs at the terminals. Each terminal would handle routine maintenance for its facilities, and would be equipped to handle emergency spills and repairs as part of the applicant's oil spill contingency plan (see Section 1.2.3.3).

Security fencing, lighting, and access roads would be provided for each pump station and maintenance location. Roads would consist of existing main roads and roads along the existing and new rights-of-way.

1.1.2 Scope of project

It is recognized that the crude oil surplus which is expected to develop in PADD V in 1978 will consist of crude of the quality of Alaskan North Slope crude, but that the surplus will not necessarily consist entirely of North Slope crude. For the purposes of this statement, the scope of the proposed

project involves transportation of Alaskan North Slope crude oil from Valdez, Alaska, via a Sea Leg to Long Beach, California; development of Long Beach port, storage, and terminal facilities; development of an oil pipeline by construction of 236.8 miles of new pipeline and conversion of 789.8 miles of existing natural gas lines; and termination of the oil pipeline at Midland, Texas. Pipeline development would include pump stations, transfer stations, auxiliary facilities and transmission lines, and a Midland terminal.

1.1.2.1 Stages of implementation

As proposed by SOHIO, and presented herein, the Long Beach, California, to Midland, Texas, portion of the project would be constructed as soon as all legal requirements have been met and authorizing actions completed. Figure 1.1.2.1-1 represents the stages of implementation as proposed by the applicant.

1.1.2.2 Life of the project

The life of the project would be determined by, among other considerations, the amount of crude oil available. The life of the pipeline would largely be determined by whether adequate maintenance has been given to the existing natural gas lines and whether the cathodic protection system has been adequate to preclude corrosion of the lines. If these factors have been properly accomplished, the expected life of the line could reasonably be 25 to 35 years or more. The year 2000 has been established as the termination of the project for analysis purposes. Facilities will probably still be in place at that time, and if suitable products and appropriate markets exist, use may continue well past that time.

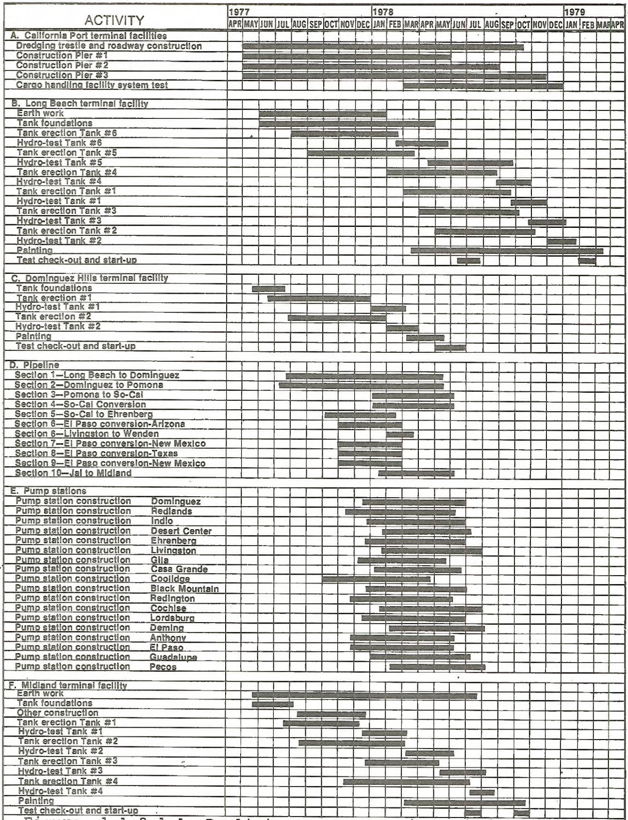


Figure 1.1.2.1-1 Preliminary construction schedule, proposed Long Beach, California, to Midland, Texas, pipeline

1.2 PROPOSED ACTIONS

1.2.1 Sea Leg

In early 1977, SOHIO began discussions with the U.S. Coast Guard with a view to establishing a vessel traffic separation system along the West Coast similar to that which now exists in coastal areas of the North Atlantic Ocean. This system recommends routes that my be safely traveled and, while presently not committed, would route tankers 20 miles apart on routes north and south along the West Coast. These recommended routes would be placed on all charts used by tanker masters, and deviation from the charted lanes, except in emergency, would result in action against the vessel master.

1.2.2 West Coast Port and terminals

1.2.2.1 Long Beach

A 42-acre port facility to be constructed in San Pedro Bay at the Port of Long Beach would be located approximately 2,500 feet south of Pier J as it now exists. It is proposed to consist of three fixed mooring berths for unloading crude oil tankers and a pile-supported trestle to connect the unloading facilities to the onshore terminal. In addition, the Port would be required to construct a breakwater on the southern side of the berthing area to protect the berthing area from wave action.

Dredge and fill

The present depth in the area of the proposed Pier J berths is approximately 42 feet mean lower low water (MLLW). Dredging this area to 62 feet is planned in order to provide adequate clearance for 165,000 DWT tankers. Approximately 2.5 million cubic yards of spoil material would be removed. The Long Beach Port Authority would be responsible for the design of the marine facilities of the proposal and would conduct the dredging operation,

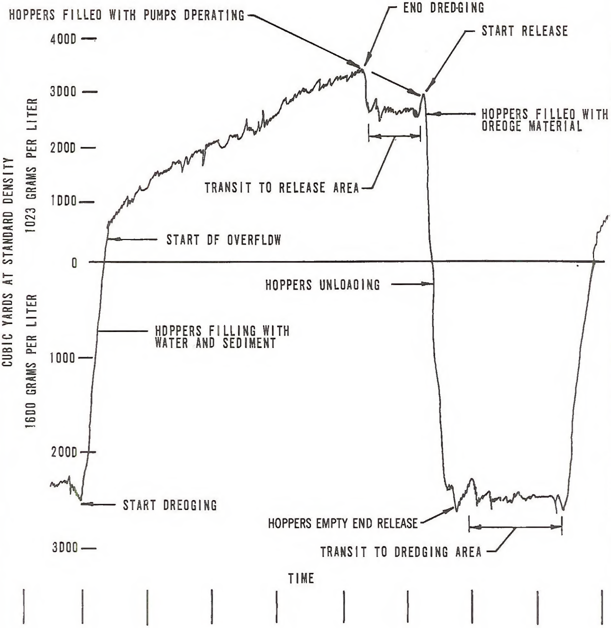
as well as handle disposal of the spoil. Dredge spoil suitable for fill material would be utilized in building the new breakwater. Unsuitable and excess dredge material would be placed at the EPA Interim Dumping Site, Los Angeles #2 (Public Notice #76-110), as approved by the U.S. Environmental Protection Agency (EPA). This dumping site is located 11.2 miles seaward (west-southwest) of Long Beach Harbor.

A hopper dredge or barge-mounted bucket dredges and bottom-dump barges would be used to dredge approximately 1.5 million cubic yards of bay bottom material. Depending on the disposal locations, cutter-head suction dredges, hopper dredges, or barge-mounted bucket dredges and bottom-dump barges would be used to dredge an additional 1 million cubic yards of sediment. The operation cycle of a hopper dredge, as represented on Figure 1.2.2.1-1 is a typical graph of vessel displacement correlated to the hopper capacity. The time of the cyclic dredging operation would vary dependent on the capacity of the dredge used, the type of material being dredged, and the time of hopper transit to the disposal area.

Hydraulic dredges would be utilized to deepen the existing harbor in the area adjacent to the berths.

Current plans call for the breakwater to be located south of the berthing area, and to be composed of quarry waste rock, armor rock, and contained dredge material. The planned source for the rock is the Santa Catalina Island rock quarries. An estimated 2.6 million tons of material would be required as follows: (1) quarry rock, 1,250,000 tons; (2) armor rock, 200,000 tons; and (3) dredge fill, 700,000 cubic yards. Barges and cranes would be utilized in placing the breakwater.

The amount of equipment required, primarily dredges, cranes, and pile drivers, would be dependent on the rate of progress required to construct the facility in accordance with the overall start-up schedule.



Source: *Dredge Disposal Study, San Francisco Bay and Estuary, Appendix A*, June 1974

Figure 1.2.2.1-1 Hopper dredge operation cycle

Tanker berths

The three fixed berths would be constructed by the Port of Long Beach to hold the tankers in mooring while unloading the crude oil. It is expected that the berths would consist of prestressed concrete girders resting on concrete piles. There also would be a series of breasting and mooring timbers or piles driven into the ocean bed to protect the pier structure by absorbing impact forces of the tankers during berthing and unloading. Catwalks would provide access from the berths to the mooring dolphins.

Dockside utilities would be provided by service points at each berth and would include water service for the tankers. At present no sewage facilities are planned for vessel use; however, the ships would comply fully with current regulations governing sewage discharge. Tanker bunker fuel service would be provided by pipeline at each berth.

Mechanical unloading arms and metering

At each berth a tanker would connect to permanently installed, mechanical, marine unloading arms and would transfer the crude oil at a maximum of 125,000 barrels per hour (bbl/hr) through meters to the storage tanks. Four 16-inch arms would handle the transfer of crude, and one 12-inch arm would connect the tanker with a low-sulfur bunker fuel supply. The arms would be operated from a control console at each berth, and remote control would make operation possible from the tanker deck. All arms would be designed to adjust to tanker movements during unloading and changes in tide levels. Crude oil discharges would be metered. A meter prover would be used to exact the meter readings. The receipts would be correlated with meters throughout the pipeline system. SOHIO has indicated that it would rely on the metering system for all transfer payments. This would eliminate the need for the traditional practice of opening tanker hatches and dipping to measure oil cargoes.

Trestle

A pile-supported, concrete, F-shaped trestle approximately 4,700 feet long would connect the berthing area to the onshore terminal. Piles for the trestle and berths would be driven from a floating barge in open water. Approximately 1,000 piles would be needed to support the facility. It is estimated that 40,000 cubic yards of concrete and 300 tons of structural steel would be required for the trestle and berths. The trestle would be constructed by the Port and would carry three 48-inch crude oil transfer pipelines from the berthing area to shore. The trestle also would support a vehicle access roadway, utility pipelines, bunker pipelines, electric cable raceways for power and control circuits, and telephone circuits for communication between the unloading facility and the terminal area.

Construction would begin with the dredging of the area adjacent to the unloading berths, and would be followed promptly by the trestle construction. Expedient construction of the trestle would allow construction of crude handling facilities.

Onshore construction

Onshore civil construction would include site clearing, soil densification, grading, paving, dike installation, building construction, and foundation construction.

Front-end loaders, backhoes, graders, and trucks would be used for site clearing and grading. Since the project sites are located in existing industrial areas, precautions would be taken to safeguard permanent structures and drainage patterns.

Soil densification of the proposed tank storage area will be required in order to minimize the soils' liquefaction potential in the event of a large earthquake. The applicant proposes to use the Menard "Dynamic

Consolidation" process which is reportedly capable of densifying the hydraulic fill and subgrade material to a depth of 60 feet.

Fill material for the construction would be hauled to the terminal site as required to supplement the surplus material on site. Select granular fill for foundations, roadbeds, and finish grading would also be hauled to on-site stockpiles from local but undetermined sources.

Civil construction would require approximately eight months, the first step being to provide tank pads and site access for the tank erectors.

Storage tanks

The proposed West Coast terminal facilities would include approximately 5 million barrels of storage surge tank capacity in eight 615,000-barrel floating roof tanks; six on Pier J weighing approximately 1,910 tons each, and two at the proposed Dominguez Hills terminal weighing approximately 2,050 tons each. The Dominguez Hills terminal facility would be provided with pumping and metering arrangements to deliver 200,000 bbl/d to existing pipelines which interconnect with refineries in the Los Angeles and surrounding areas, plus 500,000 bbl/d to the proposed pipeline facility to Midland. Fire fighting, control, and communications systems would be provided within the terminal facilities. Floating roof tanks would minimize oil evaporation losses. There are different types of floating roof tanks. Figure 1.2.2.1-2 is typical. The tanks on Pier J would be contained behind a reinforced concrete dike approximately 16 feet high and designed to contain 125 percent of the total tankage capacity in case of failure of one or all the tanks. An oil separator treatment system would be constructed to treat water that collects in the catch basin of the tank dike. Rainwater that collects on tank roofs would be drawn into the treatment system. All water discharged from this system would meet existing water quality standards. All storage tanks would be equipped with an automatic alarm connected to the gauging device to signal potential overflow.

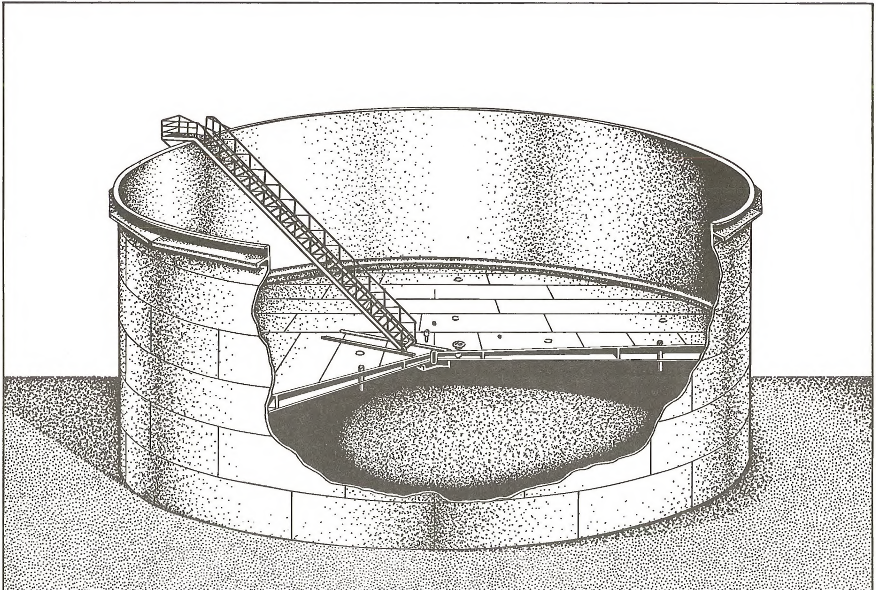


Figure 1.2.2.1-2 Typical double-deck oil storage tank with floating roof

The design, material fabrication, and erection of the storage tanks would be performed by a tank contracting firm. Material fabrication, forming, and cutting of steel plates would be performed by the tank contractor at a fabrication plant prior to delivery to the terminal site.

Upon delivery to the site, tank erection crews would construct the storage tanks. Flatbed trucks would be used to deliver the plates from the fabrication plant to the erection site. Delivery of plates would be spread through the erection schedule to permit efficient handling and storage. The plates would be moved into position for welding by conventional cranes and sideboom tractors as needed. Plates would be joined by welding, utilizing both automatic and manual techniques common to the industry.

All exposed steel surfaces of the finished storage tank would have received shop cleaning and priming prior to delivery to the site, thereby minimizing the need for field sandblasting. The tanks would receive a final protective coating of paint following erection.

Tank erection would take approximately 16 months with concurrent erection of several tanks. Crews specializing in installation of tank bottoms, shell erection, and floating roofs would move from tank to tank upon completing their specific tasks. When finished the tanks would be given a hydrostatic test by entirely filling each tank with water. This testing would be at a controlled rate conforming with the foundation design, and would be designed to accomplish a preloading and test of the foundation as well as the tank shell. The approximately 27 million gallons of water needed for tank testing would be obtained from one or two municipal water sources and would be disposed of in the ocean.

Mechanical and electrical construction

The mechanical and electrical construction of the terminal facilities would be performed by one or more of the contracting firms equipped to handle this type of installation. Facilities to be constructed or installed include marine unloading arms, unloading pipelines, and utilities from the piers to the terminal, terminal piping, pumping equipment, and controls.

Installation of the equipment on the marine structures would utilize floating work barges and land-based equipment.

Onshore facilities would be installed utilizing the conventional tools and equipment of the trades involved.

Construction duration would be approximately 16 months and would reach peak activity levels when marine structure and tank erection had progressed sufficiently to permit installation of all equipment associated with these facilities.

Personnel and equipment requirements (Port)

The personnel and equipment requirements listed in Tables 1.2.2.1-1 and 1.2.2.1-2 include the crude oil handling facilities in the tanker berth areas, tank erection, and terminal facility construction such as manifold piping and valves. The lists exclude marine construction for the Port which would be directed by the Long Beach Port Authority.

Personnel required for construction of terminal facilities would be supplied by local labor forces with possible exceptions such as supervisors. Sixteen months, or 359 working days, are estimated for construction on a schedule of 10 hours/day, 5 days/week. Working hours would be negotiated with the construction contractors and would be tailored to meet local requirements. At the present rate, a weekly payroll of $183,100 is expected, with average

earnings per worker for the entire construction period estimated to be $51,154.

Table 1.2.2.1-1

Personnel Requirements for Port Construction at Long Beach[a]

CLASSIFICATION	Number Required
Superintendents	3
Supervisors	8
Operators	30
Teamsters	23
Welders	30
Welders' helpers	30
Laborers	42
Carpenters	6
Boilermakers (tank welders)	35
Boilermakers (pipe fitters)	20
Electricians	10
Electricians' helpers	10
Office supervisor	1
Assistant office supervisor	1
Millwrights	4
Millwrights' helpers	4
Total	257

Source: Williams Brothers Engineering Company, 1976.

[a] Excludes marine construction.

The construction equipment and operators would be provided by the construction contractors. Table 1.2.2.1-2 represents typical equipment owned by a contractor and used for tank and terminal construction. The

equipment would be used for grading, building foundations, welding tanks and manifold piping, compacting, and lifting heavy equipment. Also included are temporary office equipment, support equipment for the equipment and operators, and the type of fuel required, such as gasoline or diesel.

Table 1.2.2.1-2

Typical Contractor Equipment for Tank and Terminal Construction

ITEM	Description	Number Required
Front-end loader	Rubber-tired, 980 Diesel, 250 hp	4
Paving breaker	Diesel, 250 hp	2
Backhoe	1-1/4 yard LS98, diesel, 190 hp	3
Motor crane	Diesel, 190 hp	5
Sideboom 572	Diesel, 250 hp	4
Welding machines	Gasoline, 75 hp	5
Pickup	Gasoline, 200 hp	10
Auto	Gasoline, 200 hp	4
Parts van	Diesel, 250 hp	2
Bus	Gasoline, 300 hp	2
Flatbed truck	Diesel, 250 hp	2
Truck	Lowboy bed, diesel, 130 hp	3
Stringing truck	Diesel, 150 hp	1
Air compressor	600 cfm, gasoline, 125 hp	3
Air compressor	150 cfm, gasoline, 90 hp	3
Jackhammers		7
Tamping machines		7
Office trailer		3
Roller	10 ton, diesel, 150 hp	2
Sheepsfoot roller for compaction		2
Tractor	Gasoline, 75 hp	2
Hand compactor	Gasoline, 5 hp	2
Welding machines	Gasoline, 50 hp, w/wagon	4
Motor grader	Diesel, 150 hp	2
Water truck	Gasoline, 200 hp	1
Pumps	4-inch	2
Dump truck	10 yard, diesel, 150 hp	5
Work barge	W/crane and related equipment	unknown

Source: Williams Brothers Engineering Company, 1976.

Amounts of petroleum products, which would be consumed during construction of the proposed facilities are based on operating and maintaining the equipment on a daily basis. The products would be purchased locally and

stored at the construction site. Table 1.2.2.1-3 shows estimated fuel use at the West Coast terminal.

Table 1.2.2.1-3

Estimate of Fuel Use During Construction Activity
Long Beach Port and Terminal[a]

PRODUCT	Amount Required
Diesel fuel	539,300 gals
Gasoline	183,400 gals
Lubricating oil	300 drums
Grease	6,700 lbs

Source: Williams Brothers Engineering Company, 1976.

[a] Excludes marine construction and construction at Dominguez Hills.

1.2.2.2 Midland terminal

Civil construction. Civil construction of this facility would include site clearing and grading, tank foundations, dikes, and roadways. The site of the 70.9-acre terminal is on land which is part of an existing tank farm. A minimal amount of clearing and grading is expected in order to provide a suitable site.

Select granular fill for foundations and roadbeds would be hauled from surrounding areas capable of producing the type and quantity of material required. Specific locations of these sites have not been determined.

Civil construction would be the first activity in the terminal construction schedule, and would require four to six months.

This terminal would also include metering and pumping installations to make deliveries of crude oil to other interconnecting pipelines for distribution to eastern, northern-midwestern, and Gulf Coast refineries.

Tank storage area. The Midland terminal would include a tank storage area of approximately 70 acres. This area would be designed to meet secondary-containment requirements established by various regulatory agencies. A dike approximately 6 feet high would provide 125 percent containment of the tanks, and access ramps would be provided for service vehicles. The surface, enclosed by the earthen dikes, would be graded to direct the flow of storm water into a catch basin at one end. All runoff water would be processed through an oil/water separator before discharge. Separated oil would be collected in a sump tank, and would be pumped periodically back into the storage tanks.

Crude oil storage tanks. Four floating-roof tanks would be erected in the tank storage area to receive the crude from the pipeline system. Each tank would have a working capacity of 500,000 barrels, and would be approximately 66 feet high and 245 feet in diameter. Each tank would be constructed on a ringwall or earthen pad with a common inlet/outlet connection in the tank bottom. Sediment buildup occurring inside the storage tanks would be controlled with appropriate mixing equipment. Overflow protection would be accomplished with an automatic alarm installed in the tank gauging device.

Tank erection. The erection of the storage tanks would be carried out in the same manner as described in the section on tank erection for Port/terminal facilities. The overall duration of tank erection would be as required to coincide with the completion of the pipeline construction.

Metering stations. Crude oil deliveries to existing facilities would be metered by turbine meter systems. A meter prover would be used to exact the meter readings. The deliveries would be correlated with California terminal meters and meters throughout the pipeline system to provide information on

pipeline integrity and inventory. Deliveries also would be metered for establishing accurate custody transfer records. The metering station would consist of conventional turbine-type pipeline meters and meter provers for establishing meter accuracy.

Pumping units. Vertical can-type booster pumps would be installed for providing volumes and pressures required to service the existing pipeline systems.

Fire protection and safety. Fixed position and portable fire extinguishing systems would be used at all of the facilities, as well as the fire-fighting equipment within the jurisdiction of the local authorities.

Drainage and waste control systems. Drainage and waste water flow from the terminal facilities would be storm water, domestic waste water, and waste waters that possibly have been contaminated with oil. The drainage systems would collect the water in separate systems. Domestic waste water would be treated by an acceptable method before discharge.

The areas around pumps, scraper traps, and meters may become contaminated with oil even though good housekeeping procedures are practiced. Collection sumps and pumps are planned for these various areas. These areas would be curbed and the runoff drained to an oil/water collection system.

Atmospheric emission control. Atmospheric emission would be minimized as an integral part of the operational facilities design. The primary objective is the control of hydrocarbon vapor. The most significant design feature would be the use of floating-roof tanks. These tanks would comply with Federal performance standards for petroleum liquids storage vessels and the requirements of the Texas Air Quality Control Board for the handling of crude oil. In addition, mechanical seals would be used for pumps in order to eliminate sources of emission.

Roads. Access roads to pump stations and along the pipeline right-of-way would be maintained for pipeline maintenance/operations personnel and equipment.

Personnel

The personnel requirements at Midland would possibly be furnished by the local labor force. Since the facilities to be constructed are considerably fewer than those at the West Coast terminal, the total personnel would be reduced accordingly. The same labor classifications would be required.

1.2.3 Long Beach, California, to Midland, Texas, pipeline

1.2.3.1 Abandonment and conversion of gas pipeline

El Paso Natural Gas Company has applied to the Federal Power Commission (FPC) to abandon 667.3 miles of 30-inch and 2.1 miles of 26-inch natural gas pipelines which transport gas from the Permian Basin to the Colorado River. El Paso Natural Gas Company and SOHIO have entered into a lease agreement for abandonment of this gas pipeline. Subsequent to FPC approval of such abandonment, the line would be converted to crude oil transport. In California, SOHIO Transportation Company and the Southern California Gas Company have a similar agreement on 120.4 miles of 30-inch gas pipeline contingent on approval and permission from the California Public Utilities Commission. Conversion of existing natural gas pipelines to crude oil service would provide approximately 790 miles of main line for the proposed project. The activities involved in converting an existing gas transmission facility to crude oil service are separate and distinct from new pipeline construction. These lines have been operated and maintained successfully for many years, but an objective of this proposal is to review their condition in relation to standards for liquid petroleum service.

Existing gas pipelines on two segments of the proposed route would not be utilized because (1) the existing gas pipelines from east of Desert Center, California, to Ehrenberg, Arizona, are required for natural gas service in California, and (2) the 26-inch existing gas pipeline from Livingston, Arizona, to 34 miles east cannot be used because it also is unavailable.

Transportation of gas through the remaining lines of the El Paso system after abandonment of the proposed 30-inch pipeline facilities would require the use of additional compression and compressor fuel. The delivery of gas by El Paso to its customers would be reduced by an amount equal to the additional compressor fuel volumes. The amount of additional compressor fuel which would be required is estimated as follows, based on El Paso's forecast gas sales with and without the abandonment for the years indicated.

Sales Period	Additional Compressor Fuel Requirements
May 1977 to April 1978	8.74 million Mcf
May 1978 to April 1979	7.22 million Mcf
May 1979 to April 1980	5.94 million Mcf
May 1980 to April 1981	5.19 million Mcf

By the 19th year after the abandonment, the additional fuel requirement would have declined to a level less than 500,000 Mcf per year.

No new facility construction would be required since existing compressors and compressor stations would be utilized. The compressors needed to accommodate this increased compression load would be located at the existing Gresham and Guadalupe Compressor Stations in Culberson County, Texas; the Deming Compressor Station in Luna County, New Mexico; the Willcox Compressor Station in Cochise County, Arizona; the Vail and Tucson Compressor Stations in Pima County, Arizona; the Caprock Compressor Station in Lea County, New Mexico; and the Dilkton Compressor Station in Navaho County, Arizona.

The 120.4-mile section of the Southern California Gas Company pipeline system runs from 4 miles west of Beaumont, California, to 19 miles east of Desert Center, California. The 667.1 miles of El Paso pipeline to be converted are located in the route traversing from approximately 4 miles east of Ehrenberg, Arizona, to Jal, New Mexico. A new 34.2-mile section of 30-inch pipe would be installed between Livingston and Gila pump stations in Arizona. As part of this proposal, the entire Southern California natural gas line to be used and the segment at the El Paso pipeline between Cornudas and Jal (approximately 139 miles) would be hydrostatically tested to determine the conditions of these lines. The hydrostatic test procedure is discussed in Section 1.2.3.2, Actions following construction, testing.

This 30-inch pipeline, which is presently in natural gas service, would be taken out of gas transmission service and converted to crude transport. The structural integrity of the overhead river crossings at the San Pedro River would be analyzed, and necessary reinforcements or protection would be accomplished. Other aboveground sections would be examined for structural strength and compatibility for crude oil service. Table 1.2.3.1-1 gives a summary of data concerning existing gas pipelines to be converted.

Table 1.2.3.1-1

Existing Gas Pipelines Scheduled for

Conversion to Oil Transport

(Entire Pipeline Route)

OWNERSHIP	Line No.	Size	Approx. Miles	Year Installed
Southern California Gas Company	2001	30	23	1950
Southern California Gas Company	2001	30	67	1953 to 1954
Southern California Gas Company	2001	30	31	1955
El Paso Natural Gas Company[a]	1110	30	6.5	1947
El Paso Natural Gas Company	1110	26	2.1	1949
El Paso Natural Gas Company	1103-1110	30	27	1950
El Paso Natural Gas Company	1110	30	62	1952
El Paso Natural Gas Company	1103	30	2.5	1954
El Paso Natural Gas Company	1110	30	13	1958
El Paso Natural Gas Company	1103	30	24	1966 and 1969
El Paso Natural Gas Company	1600	30	530	1969 to 1970

Source: Williams Brothers Engineering Company, 1976.

[a] Segments of several different lines are used to collectively make a 667.1 mile pipeline in Arizona, New Mexico, and Texas (El Paso lines).

As the work progresses from location to location, completed sections would be isolated, filled with water, and hydrostatically tested in accordance with normal petroleum pipeline procedures and detailed schedules. Test water would be reused by transferring from one section to another as much as possible, thus minimizing the total water requirement. Certain main-line

valves would be removed from the existing system. Some of these valves would be rebuilt and relocated in the new system where they would be required for crude oil service. The applicant has submitted a preliminary hydrostatic test plan that will require more details before it can be considered totally adequate.

Two existing gas compressor stations and four compressor units would be disconnected from gas pipeline service of El Paso in addition to the pipeline abandonment. A detailed procedure for isolating these stations would be developed. New pump stations would be constructed along the pipeline system; their locations are governed by hydraulic demands. The proposed conversion of part of El Paso's gas transmission system to crude oil service would require piping modifications at 12 existing El Paso Natural Gas Company compressor stations where a bypass pipeline for the crude oil system would be constructed. The pipeline will pass through 11 of the 12 existing compressor stations and it will bypass the other compressor station.

Included as part of El Paso's gas pipeline abandonment application to the FPC is a proposal by El Paso to abandon a total of 57,050 of horsepower (hp) compressor units which presently serve the gas pipeline proposed for abandonment. Abandonment of compressor units would occur at the existing El Paso (C) Compressor Station in El Paso County, Texas, the Florida Compressor Station in Luna County, New Mexico, the Lordsburg Compressor Station in Hidalgo County, New Mexico, and at the Casa Grande Compressor Station in Pinal County, Arizona. Also, the existing Bowie and Oracle compressor stations in Cochise County and Pinal County, Arizona, respectively, would be abandoned completely and all gas transmission facilities including fencing and foundations at those sites would be removed.

El Paso would also abandon service to five right-of-way grantor taps which are presently connected to the gas pipeline which is proposed to be abandoned. Three 2-inch and one 1-inch right-of-way grantor taps in Arizona

and one 1-inch right-of-way grantor tap in Texas and the gas service rendered by those taps would be abandoned as a result of the proposal. In all five instances, to obtain a gas fuel supply, either an alternate natural gas supply source or an alternate fuel source such as propane would need to be obtained after the proposed abandonment of gas service.

Table 1.2.3.1-2 lists personnel required for a typical conversion or tie-in activity. Average earnings per worker at present wage rates for the duration of construction activity based on working 10 hours/day, 7 days/week are expected to be $1,025 for 12 days of work on the El Paso Natural Gas system construction and $342 for the 4 days of work on the Southern California Gas system construction. The total payroll for the conversion or tie-in activity is expected to be $12,560 per week.

Table 1.2.3.1-2

Personnel Required for a Typical Conversion or Tie-In Activity

CLASSIFICATION	Number Required
Superintendent	1
Operators	6
Teamsters	2
Welders	3
Welders' helpers	3
Laborers	6
Total	21

Source: Williams Brothers Engineering Company, 1976.

Equipment for a typical conversion or tie-in activity would vary depending on the complexity and magnitude of the activity (Table 1.2.3.1-3).

Table 1.2.3.1-3

Equipment for a Typical Conversion or Tie-In Activity

ITEM	Description	Number Required
Sideboom	572 diesel, 250 hp	1
Backhoe	3/4 yard, 225 hp	1
Bulldozer	D-7	1
Tar pot		1
Pickup truck	Gasoline, 200 hp	2
Winch truck		1
Tractor	W/lowboy	1
Office trailer		1
Welding machines	Gasoline, 75 hp	3

Source: Williams Brothers Engineering Company, 1976.

All petroleum products to be used at each location during conversion and tie-in would be purchased locally, if available. Table 1.2.3.1-4 lists totals of fuels expected to be used during one typical conversion or tie-in activity.

Table 1.2.3.1-4

Petroleum Products for a Typical Conversion or Tie-In Activity

PRODUCT	El Paso Gas System	Southern California Gas System
Diesel fuel	2,100 gals	960 gals
Gasoline	840 gals	680 gals
Lubricating oil	3 drums	3 drums
Grease	55 lb	55 lb

Source: Williams Brothers Engineering Company, 1976.

1.2.3.2 Construction of pipeline

Preconstruction activity

The major field operations before construction are right-of-way acquisition and surveying.

The right to proceed would be obtained primarily by purchase or permit, and the resulting agreements that pipeline companies would enter into with landowners and responsible agencies would convey to the companies the rights to construct, operate, and maintain the pipelines. In some cases other rights might be conveyed, and in some cases special conditions would apply to the exercise of the rights. In most cases, right-of-way agreements provide that the pipeline company may (1) survey; (2) clear by cutting timber, brush, and crops to a specified width; (3) construct the pipeline; (4) restore the surface so that owner's usual use of the land may be continued; and (5) have access to the pipeline for future operation and maintenance. Sometimes it is more practical for all concerned that the land be purchased by the pipeline company. Most often the location of the pipeline is described by surveyed center-line description of its route across each piece of property. Permits would be obtained as required for crossing railroads, highways, roads, streets, rivers, canals, irrigation or drainage ditches, and various other facilities.

Ground survey crews would plot a legal survey from route locations shown on alignment maps and aerial photographs. These crews would plot all topographic factors which could affect the laying of the pipeline. Of special concern are (1) distances from corners and other features legally defining the limits of the property involved and (2) the route of the pipeline across each piece of property.

Special construction features require acquisition of additional information and careful planning to assure construction of safe structures. Examples of

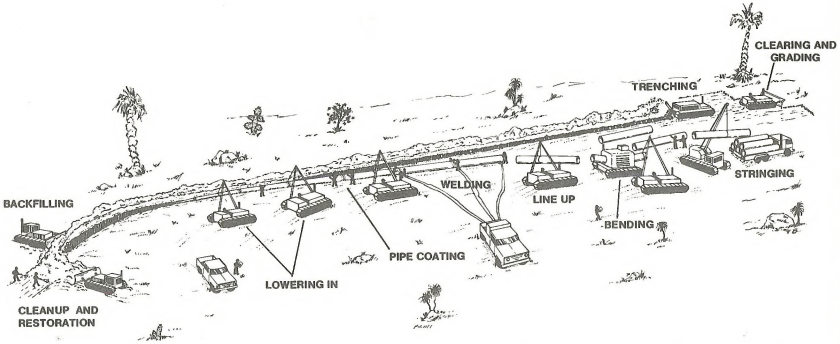
such features are rivers. Before construction, detailed investigation would be carried out. Similarly, special design consideration would be given to all major river, highway, canal, and railroad crossings.

Plans and rules of governmental and other agencies for future use of land along the pipeline route must be considered. Such plans could lead to changes in routes and therefore in construction plans. Preliminary meetings would be held with many private groups and government agencies having jurisdiction over land use along the right-of-way. Future and existing uses of land along the route identified in these meetings would be taken into consideration in the permit processing. During final design, additional contracts would be made with all affected parties to minimize (to the extent possible) the need for later design revisions resulting from land use changes or conflicts. The construction, operations, maintenance, and abandonment procedures relative to the SOHIO pipeline would follow all regulations as delineated by the Department of Transportation Office of Pipeline Safety, Parts 191, 192, 193, and 195, Title 49 of the Code of Federal Regulations.

General procedures

In laying pipe in an area such as that from Pier J to the proposed Dominguez Hills terminal, construction procedures would be essentially those used for laying pipe in or along city streets. Private right-of-way would be minimal, and most of the route would be granted for use by permit. Working space in this area would average about 40 feet in width and comprise approximately 5 acres per mile. An estimated maximum of 10 percent of the area would be subjected to construction activity at any one time. Figure 1.2.3.2-1 is a typical construction spread; Figure 1.2.3.2-2 is a typical construction profile.

Normal pipeline construction as delineated in Transportation of Liquids by Pipeline, DOT 49 CFR 195, requires coverage from 30 inches to 48 inches



SCALE CONDENSED FOR ILLUSTRATIVE PURPOSES

Source: U.S. Bureau of Mines, U.S. Bureau of Labor Statistics, American Petroleum Institute and Federal Energy Administration

Figure 1.2.3.2-1 Typical pipeline construction spread

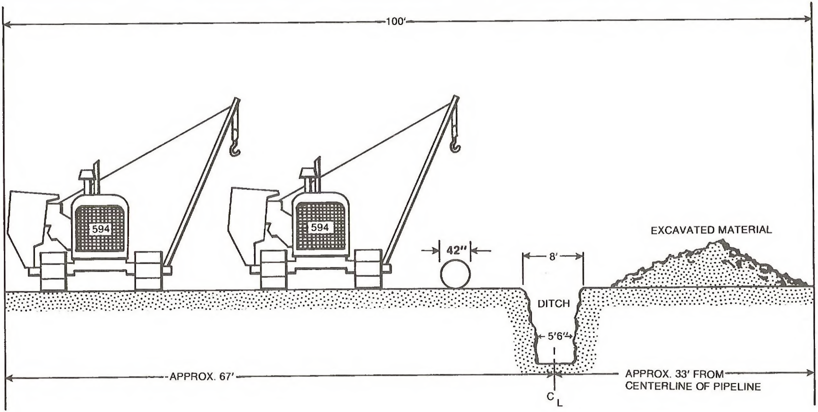


Figure 1.2.3.2-2 Typical pipeline construction profile

depending on the location. When crossing (over and under) foreign structures (e.g., pipelines, cables, etc.) a minimum clearance of 12 inches is required. The 12-inch clearance may be reduced if special precautions are taken to prevent corrosion. In circumstances where the foregoing cannot be accomplished, a mutual agreement as to spacing is generally established with the foreign pipeline operator.

Each main-line pipeline spread would be made up of several units, each having a separate function. The units would be organized to proceed with the work in the following general order: clearing and grading the right-of-way; hauling and stringing the line pipe; ditching; pipe bending, laying, and welding; applying protective coating; lowering and tying-in; backfilling; testing; and right-of-way cleanup and restoration.

Special construction would consist of fence building, road and railroad boring for casing pipe, water crossings, and block valve installation. This type of construction may be a few miles ahead of the pipe-laying crews.

The construction spread through industrial and populated areas would be somewhat smaller than a cross-country spread; personnel and equipment would be limited to minimize congestion. As previously stated, this spread would progress at a much slower rate and contain its activities within a shorter area.

The various construction units may be generally described as follows:

<u>Cleaning and grading the right-of-way</u>. Usually one of the first jobs encountered by this construction crew would be to install gates in all the fences that cross the right-of-way. Some fences serve only to show property lines, while others restrain animals. Permanent fence repairs would be completed during final cleanup operations.

Clearing would include removal of aboveground obstacles to the work such as trees, brush, crops, and boulders. Clearing also includes removal of tree stumps and roots in the ditch line that would interfere with operation of the ditching machine. Any large trees are sawed into manageable, or marketable, lengths and stacked or removed from the right-of-way. Removal of only the trees, brush, and crops necessary for construction and maintenance would be permitted.

Grading would include leveling the ground surfaces as needed to permit transit and operation of vehicles and equipment and to permit placement of the pipeline at the desired elevation. This would involve cutting away the earth in some places and building it up in others. Construction of roads and bridges, diverting streams temporarily, stabilizing soil to support heavy equipment, and various other kinds of work also would be needed.

Hauling and stringing line pipe. The pipeline ditch would be open for as little time as possible, with stringing usually preceding ditching. However, where rock blasting was required, the pipe would be strung after blasting in order to avoid possible damage.

Pipe-stringing trucks would be used to transport the pipe in 40- to 80-foot sections from shipment point or storage yards to the pipeline right-of-way. As the trucks carry the line pipe along the right-of-way, sideboom tractors would pick off a section at a time and lay them end to end beside the ditch line for future lineup and welding. Turnaround areas for the trucks carrying pipe would be provided along the construction right-of-way.

Ditching. Ditching would include all excavation work required to provide a ditch of the specified dimensions and depth of pipe cover. Where possible, a conventional ditching machine would be used. A backhoe or other equipment would be used in ditching where use of a trenching machine would be difficult. In extremely rocky terrain, it might be necessary to blast rock into manageable sizes. Ditching also might be accomplished by backhoes,

power shovels, draglines, hand tools, plows, rippers, and other methods or combinations of them.

Ditching in the vicinity of other underground structures requires special care. This is especially true in regard to other pipelines, cables, and conduits that cross or are buried along the ditch line. Extra care would be exercised in searching out such structures and all parties concerned would be contacted. Pipeline owners' representatives would observe excavation and other operations that might affect the structures.

Pipe bending, laying, and welding. The pipeline would be bent to conform to the terrain and fit the contour of the ditch both vertically and horizontally. As much as possible the ditch bottom would be level enough and straight enough for the pipe to fit by natural flexure induced by its own weight.

The pipe would be bent by placing individual lengths of it in bending machines. Complete bends would consist of series of small bends, each of which would be made by a pull of the bending machine at one position on the pipe. Right-of-way conditions sometimes require pipe bends of such short radius that field bending is not practical. In these cases manufactured or shop-made bends would be used.

Laying the pipe would include lineup for welding, holding it in position during the first welding pass, and lowering it onto skids or blocks. Internal lineup clamps would be used to align the pipe joints whenever possible with external clamps being used as required.

Following the laying crew, the welding crew would apply the remaining weld passes to bring the thickness of the weld to the thickness of the pipe and would finish by applying a cap of about 1/16-inch thickness.

Pipeline welding requires the exercise of arts and skills by the welder that can be acquired only by study and practice. Industry standards and governmental regulations require that welders demonstrate their skill and competence by making sample welds similar to those to be made on the project. These welds are examined and tested for strength, ductility, and other properties as part of a prescribed qualification procedure. The procedure provides for retesting of welders as needed and the maintenance of welder qualification records.

Two weld-testing types are available to welding inspectors. These are nondestructive and destructive testing. Nondestructive tests, as the name implies, include radiography, magnetic particle inspection, and dye penetrant or ultrasonic tests which may be performed on welds without affecting their properties or future usefulness. This method is applicable to production welds, including field welds. Destructive tests include determining tensile strength of welds or adjacent pipe metal by pulling samples of them until they break and measuring the tension required. Samples of welds are broken and examined for defects. Bend tests are performed to determine ductility and to determine the presence or absence of certain defects. Destructive tests would be required for welds made as a part of welding procedure qualifications. Tests for welder qualification would be carried out by destructive means.

<u>Protective coating</u>. After thoroughly removing all dirt, rust, and loose mill scale, the pipe coating would be applied in a coating plant located either at the mill or field. Approved methods of transportation and handling of coated pipe would be rigidly followed to protect the coating. All weld-joint areas would be repaired prior to lowering or backfilling.

Inspection of all required phases of the coating operation would be made to ensure that each step in the procedure is performed properly. Coating irregularities that would permit moisture to reach the pipe would be located by means of an electrical "holiday" detector. The detector develops an

electrical potential between the pipe and an electrode in contact with the outside of the coating or ground. The electrical potential is high enough to produce an arc in air longer than the coating thickness, but not high enough to produce an arc through a satisfactory thickness of coating. Pinholes of microscopic size can be detected. All coated pipe would be tested prior to backfilling.

Lowering and tying-in. The pipe would be lifted and lowered into the ditch by two or more side-boom tractors operating conjointly and spaced so that the weight of unsupported pipe would not cause buckling or other damage. Rubber rollers or padded slings would be used so the tractors could lower-in the pipe as they travel along the ditch line without damage.

Tie-ins would be required whenever there was a break in the continuous operation of the main-line pipe crews. This would occur at road crossings, water crossings, block valves, and other special locations. Tie-in welds are usually made in the ditch at the final elevation and each such weld requires pipe handling for line-up, cutting to exact length, pipe cleaning and coating, and backfilling, in addition to normal welding and weld inspection.

Backfilling. A variety of backfilling procedures would be used to perform the work effectively and economically and to comply with specifications regarding protection of pipe and coatings. Motor graders, angle dozers, and crawler-mounted, side-pull backfillers would be used to move dirt from the spoil bank to the ditch. Where necessary, the backfilled earth would be compacted to avoid later settling that would leave a surface depression. In certain areas where damage could occur to the pipe coating, protection would be provided by padding the ditch with clean sand or earth backfill.

Special construction

Some items of construction would require the use of specialized equipment and procedures. The following route crossing situations are some typical jobs requiring special construction. Additional discussion of these crossings appears in Chapter 2, Section 2.1.14.3.

Highway and railroad crossings. Roadbeds supporting roadways or railroads would be crossed in most cases by boring a hole horizontally from one side to the other. The cutting head of the boring auger would be slightly larger than the casing pipe or line pipe. The pipe would be installed immediately behind the cutting head as it advanced. Various means would be used to keep the boring head on course. This control would be used because the pipe needs to be almost perfectly straight and at the prescribed elevation. Steel casing would be used to encase road crossings where required by Federal (including Department of Transportation), state, local, or railroad authorities. Table 1.2.3.2-1 is a list of highways and railroad crossings for the proposed pipeline system. Information on the crossings was obtained from state and county road maps and miscellaneous sources. As the survey crews proceed, the roads would be listed on a pipeline milepost basis. Figures 1.2.3.2-3 and 1.2.3.2-4 are typical profiles of cased and uncased pipelines crossing highways and railroads.

Table 1.2.3.2-1

Highway and Railroad Crossings for Proposed Pipeline

CROSSING	Miles from Pier J
California	
Southern Pacific Railroad	3.13
California 1	4.21
Interstate 405	6.70
Southern Pacific Railroad	7.26
Union Pacific Railroad	7.61
California 7	7.88
Southern Pacific Railroad	8.60
Southern Pacific Railroad	8.81
Southern Pacific Railroad	8.97
Southern Pacific Railroad	9.00
Southern Pacific Railroad	9.46
Southern Pacific Railroad	9.49
Southern Pacific Railroad	9.65
Southern Pacific Railroad	9.86
Southern Pacific Railroad	9.94
Southern Pacific Railroad	9.97
Southern Pacific Railroad	10.27
California 7	10.30
California 91 Alt.	12.18
California 91	12.36
Southern Pacific Railroad	14.87
Union Pacific Railroad	16.58
California 42	17.70
Southern Pacific Railroad	17.95
Interstate 5	20.40
Southern Pacific Railroad	20.62
A.T. & S.F. Railroad	21.24
Union Pacific Railroad	23.19
California 72	23.35
California 19	24.82
California 60	28.14
Interstate 605	28.61
Union Pacific Railroad	31.52
Southern Pacific Railroad	33.32
Southern Pacific Railroad	34.35
California 39	34.71
Union Pacific Railroad	40.18
California 60	40.90
California 71	47.50
Southern Pacific Railroad	49.40
California 192	52.13
California 31	58.12
Union Pacific Railroad	59.91
California 60	60.79
Southern Pacific Railroad	64.01
California Alt. 395	73.10
Union Pacific Railroad	73.13
Union Pacific Railroad	73.15
Southern Pacific Railroad	73.39
Interstate 15E	75.50
Southern Pacific Railroad	76.92
Southern Pacific Railroad	92.49
Interstate 10	95.29
Interstate 10	114.57

Table 1.2.3.2-1 (Continued)

CROSSING	Miles from Pier J
Interstate 10	123.97
Interstate 10	158.03
Interstate 10	169.14
Eagle Mountain Railroad	182.67
Interstate 10	191.26
Interstate 10	213.01
California 78	237.08
A.T. & S.F. Railroad	240.35
Arizona	
U.S. Route 95	263.0
Southern Pacific Railroad	344.6
U.S. Route 80	363.5
Southern Pacific Railroad	386.9
Southern Pacific Railroad	414.9
Arizona 93	419.6
Interstate 10	424.5
Arizona 87	434.7
Southern Pacific Railroad	435.0
U.S. Route 80	453.5
Arizona 77	484.1
Interstate 10	549.2
Southern Pacific Railroad	549.5
Interstate 10	575.0
Southern Pacific Railroad	575.4
New Mexico	
Southern Pacific Railroad	607.7
Interstate 10	609.1
Southern Pacific Railroad	612.1
Interstate 10	619.2
Southern Pacific Railroad	619.5
Southern Pacific Railroad	659.9
Interstate 10	660.1
New Mexico 11	670.0
Interstate 10	704.9
Southern Pacific Railroad	705.1
New Mexico 28	749.8
Atchison, Topeka and Santa Fe Railroad	754.2
New Mexico 20	754.5
Interstate 10	756.7
Texas	
U.S. Route 54	771.7
Southern Pacific Railroad	772.3
Texas 62/180	788.4
Texas 62/180	831.3
Texas 62/180	838.5
Texas 62/180	839.9
Texas 62/180	854.0

Table 1.2.3.2-1 (Continued)

CROSSING	Miles from Pier J
New Mexico	
U.S. Route 285	901.3
Atchison, Topeka and Santa Fe Railroad	903.5
Texas and New Mexico Railroad	953.5
New Mexico 18	954.0
Texas	
Texas 115	972.1
Texas 181	980.8
U.S. Route 385	993.4
Texas 1788	1,002.1
Texas 349	1,014.3
U.S. Route 80	1,023.3
Texas and Pacific Railroad	1,023.8

Source: Williams Brothers Engineering Company.

Water crossings. The new pipeline would be buried at all water crossings except for those of concrete-lined watercourses such as the Los Angeles River. Water crossings on the existing pipeline would be examined to ensure their adequacy and integrity. The exposed San Pedro River crossing is on one of the existing support structures which has been analyzed to determine the structural integrity and is structurally adequate with minor revisions. The minor revisions are the installation of two small pipeline supports; one on each end of the river crossing and the readjustment of the Grinnell roller pipe hangers. Table 1.2.3.2-2 shows the water crossings.

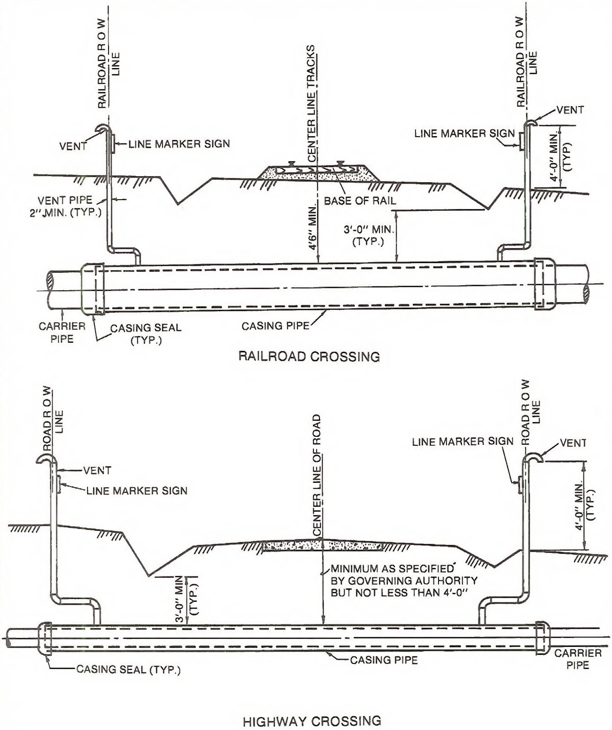
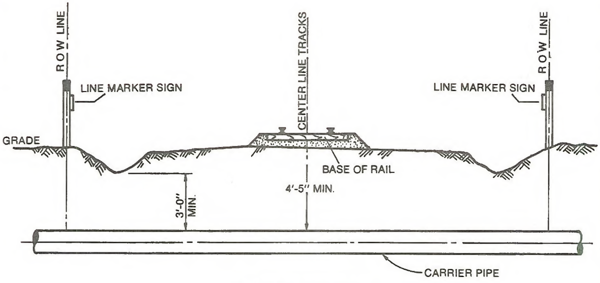
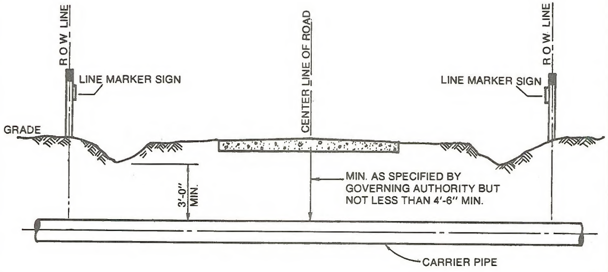


Figure 1.2.3.2-3 Typical profile of cased pipeline crossing major railroads and highways



RAILROAD CROSSING



HIGHWAY CROSSING

Figure 1.2.3.2-4 Typical profile of uncased pipeline crossing railroads and highways

Table 1.2.3.2-2

Water Crossings of Proposed Pipeline

CROSSING	Description	County and State
Los Angeles River	New, aboveground	Los Angeles, California
Compton Creek	New, buried (concrete coated)	Los Angeles, California
San Gabriel River	New, buried (concrete coated)	Los Angeles, California
Santa Ana River	New, buried (concrete coated)	San Bernardino, California
San Timoteo Wash	New, buried (concrete coated)	Riverside, California
San Gorgonio	Existing, buried	Riverside, California
Colorado River	New, buried (concrete coated)	California/Arizona
Gila River	Existing, buried	Maricopa, Arizona
Santa Cruz River	Existing, buried	Pinal, Arizona
Florence-Casa Grande Canal	Existing, buried	Pinal, Arizona
San Pedro River	Existing, aboveground	Pima, Arizona
San Simon River	Existing, buried	Cochise, Arizona
Dry Lake	Existing, buried	Hidalgo, New Mexico
Rio Grande	Existing, buried	Dona Ana, New Mexico
Pecos River	New, buried (concrete coated)	Eddy, New Mexico

Source: Williams Brothers Engineering Company.

Special temporary land requirements for pipeline construction would be required for crossing rivers. For the major rivers, the depth of line burial and extra work equipment would require additional working space. Where required, these installations would double the width of the minimal working area to a total width of 200 to 300 feet. This additional space would be required for about one month during the construction period.

Because of its width and depth, the Colorado River crossing requires extra working space for construction activities. The actual alignment of the crossing would be defined by a survey and stipulated by permits. However, additional space on each bank would be temporarily used in preparing the pipe for transit. The final design of the crossing has not been determined, but information developed to date indicates that 10 acres of land would be needed in addition to that required for the upland approach to the river.

The extra space would for the most part be confined to one side of the river, and would involve a corridor of land approximately 200 feet wide and 1,200 feet long. Figures 1.2.3.2-5, 1.2.3.2-6, 1.2.3.2-7, 1.2.3.2-8, 1.2.3.2-9, and 1.2.3.2-10 delineate the normal construction procedure for laying pipeline across river crossings. Table 1.3.1-1 lists Federal departments, agencies, and agency subdivisions having project approval requirements.

For submerged crossings, the pipe would be buried in the stream or riverbed at a depth below the probable future scour level. This would require specialized equipment to prepare the ditch. Various types of mechanical equipment would be used as well as a combination of excavating and materials handling units that can serve as backhoe, dragline, clamshell, or crane.

If the river bottom contains solid rock, drilling and blasting would be required to obtain the necessary ditch depth. Blasting for water crossings as well as on land would be handled by expert personnel utilizing multiholed low-intensity charges sufficient to fracture the rock without scattering debris over large areas.

Piping construction procedure would include making up strings of pipe on land, examining the welds, applying protective coatings, adding weight in the form of concrete coating to the pipe if needed to reduce buoyancy, and hydrostatically testing the pipe strings. All work to be done on the pipeline would be completed before installation in the stream, and care would be taken to avoid letting any construction debris fall into the stream. Retesting after installation also would be done. Empty pipe would be carried or floated into position with the aid of floats tied to the pipe and sunk by cutting loose the floats.

Wherever possible, all major stream crossings would be scheduled and planned for installation during the normal period of low streamflow. Aerial crossing of the Los Angeles River (which is not navigable at this location)

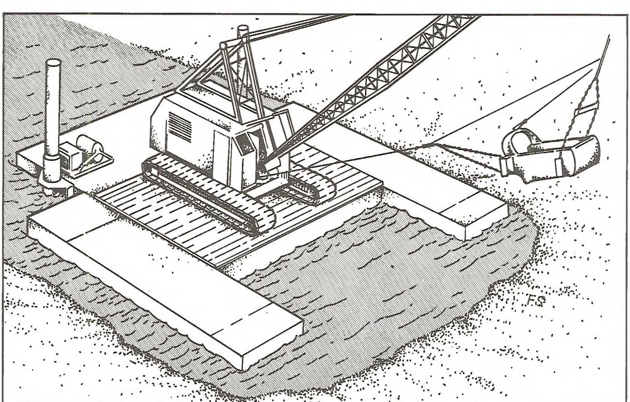


Figure 1.2.3.2-5 Typical dragline dredge for river crossing

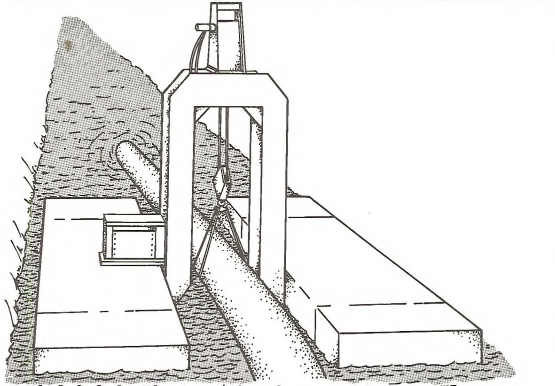


Figure 1.2.3.2-6 Floats with yoke assembly on floating bridge

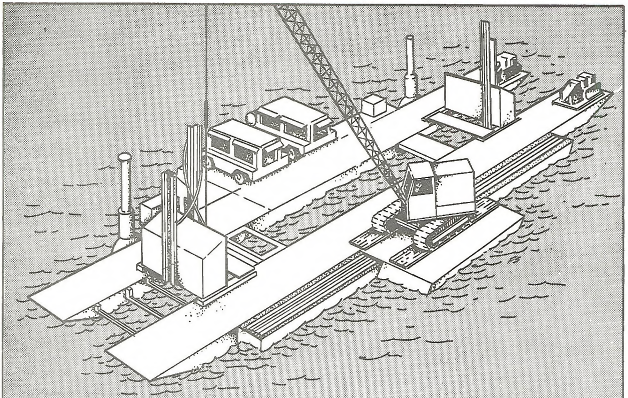


Figure 1.2.3.2-7 Rock drilling assembly crossing river

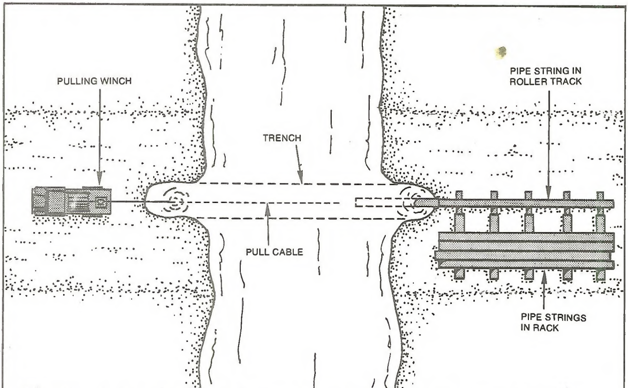


Figure 1.2.3.2-8 Bottom-pull method of pipe installation

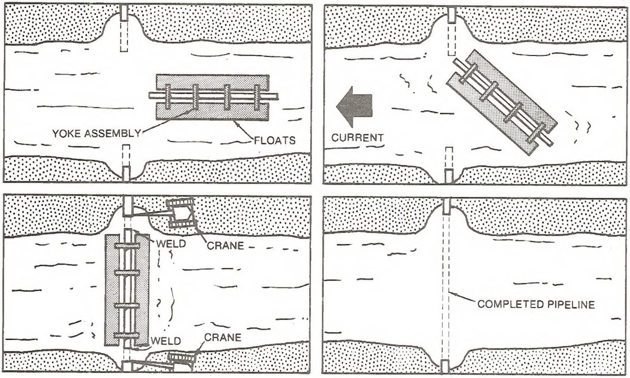


Figure 1.2.3.2-9 Floating-bridge method for installing pipeline at river crossing

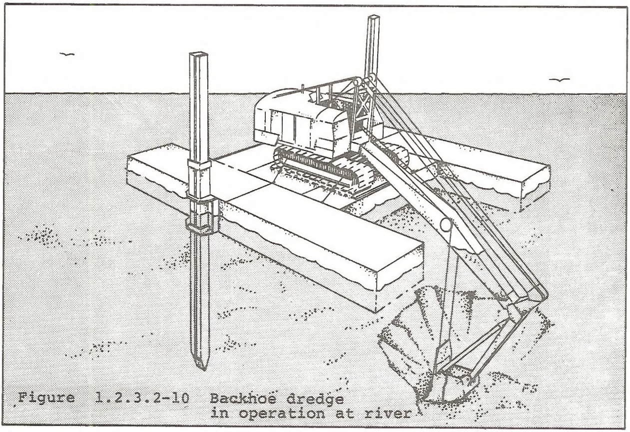


Figure 1.2.3.2-10 Backhoe dredge in operation at river

is required to avert adverse effects to existing flood control facilities. These crossings would be designed in conformance with applicable codes and would represent the implementation of good engineering practice.

Pipeline-system construction, section-by-section

Construction of the proposed project would be accomplished through the use of several construction teams working concurrently on the various portions of the pipeline system. The section from Pier J to the proposed Dominguez Hills site to Walnut township would require special construction methods designed to minimize surface working areas and any interference with other activities in these areas. The limitations of working hours and traffic interference would curtail the rate of progress and thus extend the time involved in completing the work. This portion of the project would bear little resemblance to cross-county pipeline construction because much of the work would be specialized, involving narrow work spaces, construction of special supports and burial methods adapted to urban conditions. Daily progress would vary widely due to the conditions. Several different construction teams would be involved, each tailored to specific requirements. Use of several construction teams is needed in different areas in order to meet the overall construction completion requirements. Material for this section would be stockpiled at various points between San Pedro Bay and Walnut.

From Desert Center to Ehrenberg Pump Station, part of the work would typify a cross-country pipeline spread as illustrated in the following section. The other major part of the work would be the crossing of the Colorado River. This river crossing would be under the riverbed. It would entail about two months of preparation and approximately five days for drawing the pipe across the river in a burial trench and backfilling the trench. The trench would be approximately 80 feet wide at the riverbed surface and about 17 feet deep below the bed. The excavation and backfill of this trench

would cause discoloration of the water during these operations. Material for this section would be stockpiled near Blythe, California.

Between Livingston and Gila pump stations, the installation of a new 30-inch pipeline would require 30 feet of new right-of-way for construction. This construction would be along the existing gas transmission pipeline right-of-way. It would be typical cross-country pipeline construction which would move rapidly through the areas involved. The work should be accomplished within one month to six weeks and pass any specific point in approximately two weeks.

From Jal to Midland, 73.1 miles of right-of-way would be used to install the 42-inch pipe through partly arid and partly cultivated areas. An additional 1.1 miles of right-of-way would be used to install the 16-inch pipe to connect the 42-inch pipe with the Jal transfer station and an additional 5 miles of right-of-way would be used to install the 24-inch pipe to connect to the Shell Oil Company Wight Pump Station. Table 1.2.3.2-17 depicts the pipeline spread that would be used, and a progress rate of 1 to 2 miles per day could be expected. Material for this section would be stockpiled near Midland.

<u>Pressure regulating stations</u>

Pressure regulating sites are now planned for the pipeline. Pressure regulating stations would be installed at two locations to prevent two-phase (liquid and vapor) flow from occurring under reduced flow conditions. Under certain conditions of reduced flow, each of these regulating stations would automatically restrict the main-line flow; thus the pressure would increase upstream and prevent the condition termed "two-phase flow."

The first proposed station would be located between Redlands and Indio pump stations. The other proposed station will be located between the Guadalupe

and Pecos pump stations. Final locations are subject to detailed site investigation for construction feasibility.

Each station would be automated and unattended. Each site would require less than 5 acres and would contain the necessary pressure regulating valves with associated piping, a control building, a communications tower, and a sump system. A nominal voltage power line would supply electric power for control and operation of the station.

<u>Service tanks</u>

An 80,000-barrel service tank at Indio Pump Station and a 10,000-barrel service tank at Redington Pump Station would be installed in conjunction with pressure relief valves to accommodate sudden excessive pressure in the pipeline along the entire route.

<u>Pump stations</u>

The 18 main-line pump stations would each occupy from 5.5 to approximately 10 acres of land. The function of each pump station is to increase pipeline pressure and maintain continuous flow. Pump stations are listed in Table 1.2.3.2-24. Figure 1.2.3.2-11 is a typical pump station.

<u>Pumping units</u>

A pumping unit would consist of one centrifugal pump coupled to an electric motor. The overall size of a pumping unit is approximately 7 feet wide, 20 feet long, and 10 feet high; the electric motor is the larger component. The pump and motor would rotate at 1,800 revolutions per minute (rpm).

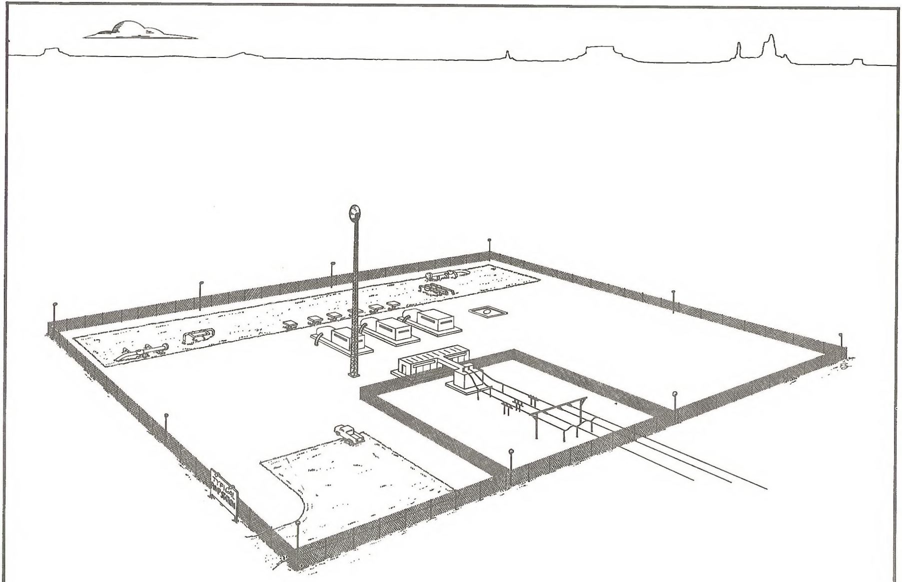


Figure 1.2.3.2-11 Typical pump station

Supervisory control and communications cubicle

The pump station control building would be approximately 60 feet by 12 feet, and would house the electrical switchgear required to control the electric substation and pumping unit motors. In addition, it would house motor control equipment for the station valves, the station local control system panel, the supervisory control equipment, and the communication equipment. The structure would be factory built, and most of the equipment would be installed prior to its leaving the factory.

Pump station piping system

The crude oil pipeline system would serve to convey the oil through the desired pumping units and would include motor-operated valves to direct the flow. A pressure control valve also would be provided in order to adjust the pressure, and consequently the flow rate, on the main pipeline.

Internal pipe cleaning

The applicant proposes to install "pig" scraper traps, using bi-diameter (expandable) type scrapers. Since every scraper requires a launcher and receiver, these launchers and receivers would occur at the following pump stations and other locations:

1. Pier J, 48-inch launcher
2. Dominguez Terminal, 48-inch receiver and 42-inch launcher
3. 4 miles west of Beaumont, a 42-inch receiver and 30-inch launcher; the So-Cal tie-in is at this location
4. 19 miles east of Desert Center, a 30-inch receiver and 42-inch launcher
5. Ehrenberg Pump Station, a 42-inch receiver and 30-inch launcher
6. Coolidge, Lordsburg, Anthony, and Guadalupe pump stations, 30-inch receivers and 30-inch launchers

7. Guadalupe Pass, 30-inch receiver; Guadalupe Pass (top), 26-inch launcher, and Guadalupe Pass (bottom), 26-inch receiver and 30-inch launcher
8. Jal, New Mexico, 30-inch receiver and 42-inch launcher
9. Midland, Texas, 42-inch receiver

Crude oil sump and sump pump

The sump system would consist of a closed steel cylinder buried deep enough to receive any oil drained from piping or pumps whenever inspection or repairs are required. Drainage would be conveyed through closed drain pipes which would connect from each pump and piping section directly into the closed sump. The sump pump would serve to return any drained oil back into the main pipeline so that no oil would be wasted.

Crude oil measurement

Meters would be installed at selected pump stations to measure flow rate continuously through the station. These continuous flow measurements would be transmitted through the supervisory control and communications system to a central computer. The computer would monitor these flow rates received from certain stations. The computer would initiate an alarm if the analysis should indicate a difference in flow or a possible leak of .5 percent or more. Tentative locations for the meters include Dominguez Hills, Redlands, Indio, Ehrenberg, Gila, Coolidge, Redington, Lordsburg, Anthony, Guadalupe, Jal, and Ector. Each berth at Pier J would have meters to record off-loading into storage tanks.

Manifold valves

Manifold valves located in the terminals and/or pump stations conform with American Petroleum Institute (API) Standard 6D.

Main-line valves

There are 107 main-line valves in the system with numerous other valves located at terminal manifolds, pump stations manifolds, pig scraper traps, and line taps. The existing main-line valves would be relocated, replaced, or eliminated if necessary, to meet operating and maintenance requirements of a crude oil line. All existing valves to be reused would be inspected, tested, and reconditioned. Valve spacing, location, and configuration would be determined by the same design criteria as on the new line segments. All valves are full opening through conduit. Remote-controlled valves will close in 5 to 8 minutes depending on valve size. Manually operated valves may, with power assist, be closed within 10 minutes as soon as they are attended. Each check valve will close independent of external control when flow reverses at the valve. Each main-line valve would occupy an area approximately 50 feet by 60 feet.

The new main-line valves would be in accordance with API Standard 6D. Remote control valves may be motor-operated, electro-hydraulic or nitrogen-driven hydraulic valves actuated by the microwave system. Remote-control valves would be located at major river crossings. Isolating valves would be installed at all river crossings. Locations are shown on Table 1.2.3.2-3. Figures 1.2.3.2-12, 1.2.3.2-13, and 1.2.3.2-14 are typical.

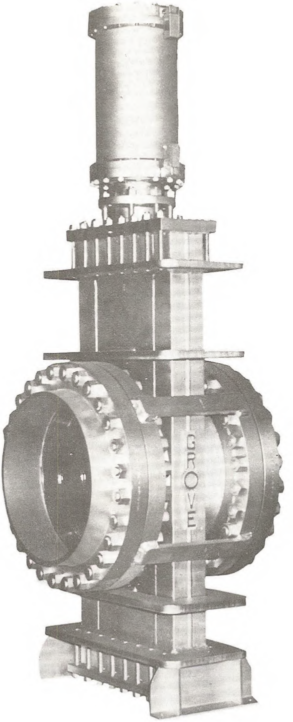


Figure 1.2.3.2-12 Typical hydraulic-operated main-line valve

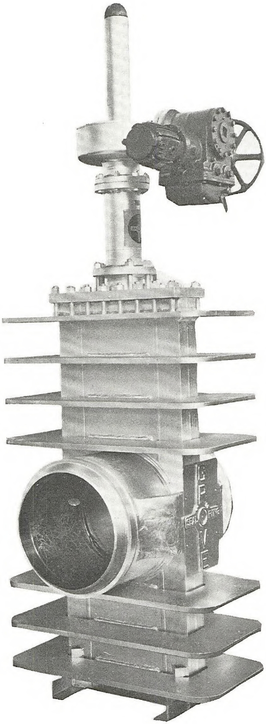


Figure 1.2.3.2-13 Typical motor-operated main-line valve

Figure 1.2.3.2-14 Typical manual-operated main-line valve

Table 1.2.3.2-3

Pipeline Remote-Control Valves

in Critical Areas

LOCATION	Location
L.A. Basin tank farm (Dominguez Hills) and 0.8 miles from Los Angeles River	Los Angeles County, California
San Gabriel River	Los Angeles County, California
Santa Ana River	San Bernardino County, California
San Jacinto fault	San Bernardino County, California
Banning-Mission Creek, San Andreas fault	Riverside County, California
Whitewater River	Riverside County, California
Colorado River	California and Arizona
Gila River	Maricopa County, Arizona
Florence-Casa Grande Canal	Pinal County, Arizona
San Pedro River	Pima County, Arizona
Rio Grande	Dona Ana County, New Mexico
Pecos River	Eddy County, New Mexico
Tank farm, Midland	Midland County, Texas

The block valve at the Los Angeles River is within 0.8 mile of the remote-control valve at Dominguez Hills Pump Station. Since the crossing is elevated, a failure in the pipe (although remote) would be at a higher elevation than any point between Dominguez Hills Pump Station and the crossing, and higher than the check valve just east of the crossing. The check valve would prevent any oil from flowing back toward the crossing. Therefore, closing of the remote-control valve at Dominguez Hills would limit the quantity of oil spilled in the same manner as would a valve adjacent to the crossing.

As with all river crossings, the line will be buried at the San Gabriel River at least 5 feet below the anticipated scour depth. Since the point of crossing is predominantly dry and cathodic protection will be utilized, it is highly unlikely that a leak would occur in this area. Should a leak occur, the check valve on the east side of the crossing would prevent back flow into the river, and drainage from the west would be prevented since the western levee road is higher than any point along the pipeline route between Dominguez Hills and the San Gabriel River. Therefore, a remote-control valve at this location would not be beneficial in limiting a spill, should a leak develop.

The crossing of the Claremont fault would be designed and constructed to withstand the maximum anticipated fault movement, thereby minimizing the possibility of failure. Should a leak occur, spillage would be limited by the remote-control valve at the Santa Ana River which is adjacent to the San Jacinto fault system. A check valve just east of the fault system would prevent any backflow in the area.

Since the Palo Verde Valley is subject to deep plowing for farming, the pipeline would be provided with 6 feet to 7 feet of cover. This burial depth significantly decreases the chances of damage by outside forces. Therefore, the possibility of a leak in this area is very remote.

The Florence-Casa Grande Canal is higher than any point between the location of the remote-control valve at Gila Pump Station and the canal itself (see Map 1.1.1-7 in Attachment 1). Therefore, should a leak occur, there would be no drainage from the west after the pipeline was shut down, and the check valve on the east side of the canal would prevent any backflow.

The confines of the Sulphur Springs-San Simon Valley are not well defined. However, the remote-control valve at Cochise Station and the check valve at the San Simon Creek would limit spillage in the event a leak occurs.

The remote-control valve at the Rio Grande is proposed to be located just east of the west edge of the Rio Grande Valley. This valve, along with the river check valve and the remote-control valve at Anthony Pump Station, would sufficiently limit spillage in the event a leak occurs.

Line pipe

Main-line sections of existing pipe would be hydrostatically tested to confirm mechanical integrity. In addition, side connections and taps would be removed. New lines would be installed across or around existing gas compressor stations as required to provide passage of pipeline scrapers. Launching and receiving traps for pipeline cleaning scrapers would be revamped if feasible for use in the crude oil service. Hydrostatic testing has been performed on 529.94 miles of the portion of El Paso Gas pipeline No. 1600 that will be converted to crude oil use. This testing was performed during 1969 to 1970, and the line has been cathodically protected. Where it is necessary to cut into this line and tie in pump stations or valves, that section will be isolated and hydrostatically tested and all welds X-rayed.

Exposed pipe

River crossings and other short aboveground spans are presently being examined in the field individually to determine if any alteration is required for crude oil service. Additional supports or protection would be provided where required.

Connecting pipeline

The only connecting pipeline is the proposed 48-inch diameter pipeline to transport oil from Pier J to the Dominguez Hills terminal, 8.9 miles from the pier.

Corrosion control

All new pipe segments would be externally coated to mitigate corrosion. The condition and quality of the external coating on the existing pipeline has been analyzed and is in excellent condition and needs no repair.

A cathodic protection system would be provided for the pipeline to supplement the corrosion prevention technique of the pipe coating. Corrosion protection test stations would be installed at necessary locations to ascertain the adequacy of cathodic protection. Both horizontal and vertical cathodes would be utilized on the cathodic protection system. A definite design for their exact location has not been completed, but it has been determined that the vertical cathodes would not be deep enough to pollute or otherwise affect groundwater aquifers.

Test leads would be installed at frequent intervals to obtain electrical measurements and data for an indication of adequacy of the cathodic protection.

Pipeline section from Pier J to Walnut, California

Construction of the pipeline from Pier J to Walnut would involve pipeline activities through the Los Angeles River flood control channels, and is estimated to consist of four pipeline spreads covering 40.5 miles. Total construction time is estimated to be 102 working days, based on 10 hours/day, 7 days/week. Total working time is estimated on laying 300 feet of pipe per day for each pipeline spread. Table 1.2.3.2-4 shows personnel requirements for this pipeline segment. Average earnings per worker for the duration of construction activity on this section are expected to total $8,513. The weekly payroll for this construction segment is expected to be $400,900.

Table 1.2.3.2-4

Personnel Required for Pipeline Construction

From Pier J to Walnut, California

CLASSIFICATION	Number Required
Superintendents	12
Supervisors	77
Operators	175
Teamsters	106
Welders	69
Welders' helpers	67
Laborers	415
Mechanics	27
Total	948

Source: Williams Brothers Engineering Company, 1976.

Equipment required for construction of the pipeline section from Pier J to Walnut would be tailored to the specialized requirements of work in industrial and populated areas. Contractors would have the option of selecting the types and numbers of equipment needed to construct each specified section or facility. Table 1.2.3.2-5 covers the equipment most likely to be needed to clear the pipeline route, string the pipe, ditch, weld, lower-in, backfill, clean up, and restore the 40.5-mile pipeline section through the Los Angeles Flood Control District.

Table 1.2.3.2-5

Pipeline Construction Equipment,

Pier J to Walnut, California

ITEM	Description	Number Required
Front-end loader	Rubber-tired, 980, diesel, 250 hp	16
Paving cutter		4
Backhoe	LS98, 1-1/4-yard, diesel, 190 hp	35
Motor crane	Diesel, 190 hp	23
Sideboom	572, diesel, 250 hp	7
Welding machines	Gasoline, 75 hp	55
Pickup truck	Gasoline, 200 hp	59
Automobile	Gasoline, 200 hp	4
Parts van	Diesel, 250 hp	4
Bus	Gasoline, 300 hp	12
Flatbed truck	Diesel, 250 hp	49
Dump truck	10-yard, diesel, 150 hp	27
Truck	Diesel, w/lowboy, 130 hp	12
Stringing truck	Diesel, 150 hp	8
Air compressor	600 cfm, gasoline, 125 hp	11
Air compressor	150 cfm, gasoline, 90 hp	21
Jackhammers		8
Tamping machine		55
Office trailer		4
Paving breaker	Diesel, 250 hp	4
Dozer	Cat D-7	6
Pipe bender		4
Line up clamps		6
Road Borer		3
Water pumps		12
Motor patrol		2
Ditching machine		2

Source: Williams Brothers Engineering Company, 1976.

Table 1.2.3.2-6 shows estimated use of petroleum products during pipeline construction for this segment.

Table 1.2.3.2-6

Fuel Use During Construction Activity, Pier J to Walnut, California

PRODUCT	Amount Required
Diesel fuel	905,400 gals
Gasoline	279,200 gals
Lubricating oil	385 drums
Grease	2,000 lb

Source: Williams Brothers Engineering Company.

Pipeline section from Walnut, California to Beaumont, California

Pipeline construction from Walnut to Beaumont would involve pipeline activities through light urban and rural areas, and is estimated to consist of one pipeline spread covering the complete distance of 53.3 miles. Personnel required are detailed in Table 1.2.3.2-7. The total construction time is estimated to be 119 working days, or 4.6 months, based on 10 hours/day, 6 days/week. Total working time is based on an estimated laying of 2,500 feet of pipe per day. Average earnings per worker for the construction of this segment of the pipeline are expected to be $15,114. It is estimated that the total payroll per week would be $337,580 at present wage rates.

Table 1.2.3.2-7

Personnel Required for Pipeline Construction

From Walnut, California to Beaumont, California

CLASSIFICATION	Number Required
Superintendents	3
Supervisors	27
Operators	128
Teamsters	40
Welders	61
Welders' helpers	80
Laborers	104
Total	443

Source: Williams Brothers Engineering Company, 1976.

Items listed in Table 1.2.3.2-8 represent typical equipment owned and used by a pipeline contractor to clear the right-of-way; ditch, weld, bend, and install the pipe; backfill, clean up, and restore the right-of-way. The equipment does not include the items required to apply the pipe coating. At this time, the protection coating is anticipated to be installed at a pipe-coating yard with the exception of a small area at the end of each pipe length which would be coated in the field after the two pipe ends are welded together.

Table 1.2.3.2-8

Equipment for Pipeline Construction,

Walnut, California to Beaumont, California

ITEM	Description	Number Required
Carryall		7
Stringing truck	Diesel, 150 hp	12
Gin pole truck for lifting		6
Bus	Gasoline, 300 hp	10
Skid truck		1
Dump truck	10-yard, diesel, 150 hp	2
Automobile	Gasoline, 200 hp	3
Truck	Diesel, w/lowboy, 130 hp	4
Office trailer		1
Warehouse trailer		2
Bulldozer	D-9 w/ripper	1
Bulldozer	D-8 w/ripper	1
Bulldozer	D-8 w/winch	4
Bulldozer	D-7 w/winch	6
Bulldozer	D-7 w/rake	1
Sideboom	583	19
Tow tractor	D-7	1
Backhoe	3/4-yard, 225 hp	15
Ditching machine	400	1
Backfiller		1
Clamshell dragline	3/4-yard	2
Hi-lift	980	1
Dragline	3/4-yard	1
Dragline	1-1/4-yard	2
Maintainer		1
Buffing tractors		2
Motor crane		1
Chain saws		7
Air compressor	365 cfm	2
Crawler-mounted drill		2
Mechanic truck		5
Bending machine	42-inch	1
Tack machine		1
Pumps	4-inch	3
Rock picker		1
Grease truck		2
Fuel truck		2
Boring machine	48-inch	1
Welding machines	Gasoline, 75 hp	17
Hot pass machine		1
Welding machine	Gasoline, w/wagon, 50 hp	40
Flatbed truck	Diesel, 250 hp	3
Pickup truck	Gasoline, 200 hp	36
Internal lineup clamp	42-inch	2

Source: Williams Brothers Engineering Company, 1976.

Petroleum products for this segment of the pipeline construction are expected to be purchased locally and stored at the construction sites. Table 1.2.3.2-9 lists the expected consumption of these products for the segment.

Table 1.2.3.2-9

Fuel Use During Construction Activity,

Walnut, California to Beaumont, California

PRODUCT	Amount Required
Diesel fuel	593,500 gals
Gasoline	240,000 gals
Lubricating oil	73 drums
Grease	5,100 lbs

Source: Williams Brothers Engineering Company, 1976.

Pipeline section from Desert Center, California, to Ehrenberg, Arizona

Personnel and equipment requirements for construction from Desert Center to Ehrenberg would be similar to the previous pipeline section in light urban areas. This segment includes the Colorado River crossing. Total construction time for the 37.1-miles is estimated to be 76 working days for approximately three months, based on 10 hours/day and 6 days/week. The total working time estimate is based on laying 5,500 feet of pipeline per day and the additional preparation time and actual work time necessary for a river crossing. Table 1.2.3.2-10 lists personnel requirements for this segment of pipeline construction. Average earnings per worker for this segment of pipeline construction are expected to be approximately $7,700. The average weekly payroll at present rates is expected to be $266,240.

Table 1.2.3.2-10

Personnel Required for Pipeline Construction

From Desert Center, California

to Ehrenberg, Arizona

CLASSIFICATION	Number Required
Superintendents	3
Supervisors	20
Operators	133
Teamsters	39
Welders	65
Welders' helpers	68
Laborers	97
Total	425

Source: Williams Brothers Engineering Company, 1976.

Items listed in Table 1.2.3.2-11 represent typical equipment owned and used by a pipeline contractor for work on a segment such as that from Desert Center to Ehrenberg.

Table 1.2.3.2-11

Equipment for Pipeline Construction From Desert Center, California, to Ehrenberg, Arizona

ITEM	Description	Number Required
Bulldozer	D-9 w/ripper	1
Bulldozer	D-8 w/ripper	1
Bulldozer	D-8 w/winch	5
Bulldozer	D-7 w/winch	6
Bulldozer	D-7 w/rake	1
Bull tow tractor	D-7	1
Sideboom	583	18
Backhoe	3/4-yard, 225 hp	14
Ditching machine	400	1
Backfiller		1
Clamshell dragline	3/4-yard	2
Hi-lift	980	1
Dragline	3/4-yard	1
Dragline	1/4-yard	2
Maintainer		1
Buffing tractor		2
Motor crane		1
Bending machine	42-inch	1
Boring machine	42-inch	1
Rock picker		1
Chain saws		7
Air compressor	365 cfm	2
Crawler-mounted drill		2
Pump	4-inch	3
Flatbed truck	Diesel, 250 hp	3
Pickup	Gasoline, 200 hp	33
Carryall		5
Gin pole truck		5
Stringing truck	Diesel, 150 hp	12
Bus	Gasoline, 300 hp	10
Skid truck		1
Dump truck	10-yard, diesel, 150 hp	2
Auto	Gasoline, 200 hp	3
Tractor	W/lowboy	4
Mechanic truck		5
Grease truck		2
Fuel truck		2
Office trailer		1
Warehouse trailer		2
Tack machine		1
Hot pass machine		1
Welding machines	Gasoline, 75 hp	14
Welding machine	W/wagon, gasoline, 50 hp	40
Internal lineup clamp	42-inch	2

Source: Williams Brothers Engineering Company, 1976.

Petroleum products for this segment of the pipeline construction are expected to be purchased locally and stored at the construction sites. Table 1.2.3.2-12 lists expected consumption of these products for the segment.

Table 1.2.3.2-12

Fuel Use During Construction Activity,

Desert Center, California, to Ehrenberg, Arizona

PRODUCT	Amount Required
Diesel fuel	210,200 gals
Gasoline	79,400 gals
Lubricating oil	32 drums
Grease	1,800 lbs

Source: Williams Brothers Engineering Company, 1976.

Pipeline section of the Livingston segment

Personnel and equipment required for this pipeline section, which runs from approximately 25.5 miles southeast of Ehrenberg, Arizona, to a point 59.7 miles southeast of Ehrenberg, represent cross-country pipeline spreads as shown in Tables 1.2.3.2-10 through 1.2.3.2-14. The 34.2 miles of new 30-inch line would be constructed with one pipeline spread in 36 working days or 1.4 months based on 10 hours/day, 6 days/week. One spread would install or lay approximately 5,000 feet per day. Table 1.2.3.2-13 lists these personnel requirements. Average earnings per worker at present rates for this segment of pipeline construction are expected to be $4,256. The average weekly payroll is expected to be $237,617.

Table 1.2.3.2-13

Personnel Required for

Construction of Livingston Segment

CLASSIFICATION	Number Required
Superintendents	3
Supervisors	16
Operators	120
Teamsters	38
Welders	37
Welders' helpers	47
Laborers	74
Total	335

Source: Williams Brothers Engineering Company, 1976.

Table 1.2.3.2-14 represents a list of contractor-owned and used equipment typical for a spread such as the Livingston segment.

Table 1.2.3.2-14

Equipment for Pipeline Construction of Livingston Segment

ITEM	Description	Number Required
Bulldozer	D-8 w/ripper	2
Bulldozer	D-8 w/winch	3
Bulldozer	D-7 w/winch	6
Bull tow tractor	D-7	1
Sideboom	D-7	3
Sideboom	572 diesel, 250 hp	4
Sideboom	581	7
Ditching machine	400	1
Backhoe	3/4-yard, 225 hp	10
Dragline	3/4-yard	1
Backfiller		1
Hi-lift	980	2
Maintainer		1
Clamshell dragline	3/4-yard	3
Motor crane		2
Boring machine	42-inch	1
Bending machine	30-inch	1
Buffing tractor		2
Tow tractor		2
Farm tractor	W/auger	2
Crawler-mounted drill		4
Air compressor	365 cfm	2
Jackhammer		4
Pump	4-inch	3
Flatbed truck	Diesel, 250 hp	5
Pickup	Gasoline, 200 hp	26
Carryall		7
Gin pole truck		4
Bus	Gasoline, 300 hp	5
Skid truck		1
Dump truck	10-yard, diesel, 150 hp	2
Auto	Gasoline, 200 hp	2
Grease truck		1
Fuel truck		1
Mechanic truck		3
Stringing truck	Diesel, 150 hp	15
Tractor	W/lowboy	4
Tractor	W/float	1
Office trailer		1
Warehouse trailer		1
Tack machine		1
Hot pass machine		1
Welding machines	Gasoline, 75 hp	10
Welding machines	W/wagon, gasoline, 50 hp	20
Internal lineup clamp	30-inch	2

Source: Williams Brothers Engineering Company, 1976.

Petroleum products for this segment of the pipeline construction are expected to be purchased locally and stored at the construction sites.

Table 1.2.3.2-15 lists expected consumption of these products for the segment.

Table 1.2.3.2-15

Fuel Use During Construction Activity of Livingston Segment

PRODUCT	Amount Required
Diesel fuel	169,500 gals
Gasoline	55,900 gals
Lubricating oil	22 drums
Grease	1,400 lbs

Source: Williams Brothers Engineering Company, 1976.

Jal and Ector transfer stations, civil construction

Civil construction of these facilities would include a minimal amount of site clearing and grading. The sites are located within the existing Texas/New Mexico tank farm and the existing Exxon tank farm, respectively.

Civil construction would be the first activity at the transfer station and would require one to two months. The transfer stations would include pressure regulation and metering to make deliveries of crude oil to existing tank farms or other interconnecting pipelines.

Pipeline section from Jal, New Mexico, to Midland, Texas

Construction personnel and equipment which would be required for the construction of the pipeline section from a point approximately 3 miles south of Jal, New Mexico, to Midland, Texas, are listed in the Tables 1.2.3.2-16, -17, and -18.

Equipment and manpower lists represent typical requirements of construction for uncongested, rural areas. The construction duration of this pipeline section is based on one spread averaging approximately 5,280 feet per day. The total construction time is estimated to be 74 working days or 2.9 months. The work schedule would be 10 hours/day, 6 days/week. Average earnings per worker (at present rates) for this segment of pipeline construction are expected to be $6,646. The average weekly payroll is expected to be $213,400.

Table 1.2.3.2-16

Personnel Required for Pipeline Construction

From Jal, New Mexico, to Midland, Texas

CLASSIFICATION	Number Required
Superintendents	3
Supervisors	16
Operators	106
Teamsters	45
Welders	60
Welders' helpers	70
Laborers	96
Total	396

Source: Williams Brothers Engineering Company, 1976.

Table 1.2.3.2-17

Equipment for Pipeline Construction, Jal, New Mexico, to Midland, Texas

ITEM	Description	Number Required
Bulldozer	D-8 w/ripper	2
Bulldozer	D-8 w/winch	1
Bulldozer	D-8	2
Bulldozer	D-7 w/winch	2
Bulldozer	D-7	3
Tow tractor	D-7	1
Sideboom	583	10
Sideboom	Diesel, 250 hp, 572	5
Motor crane		1
Ditching machine	400	2
Backhoe	3/4-yard, 225 hp	10
Dragline	3/4-yard	1
Clamshell dragline	3/4-yard	3
Backfiller	Auger, D-7	1
Hi-Lift	980	1
Hi-Lift	966	1
Bending machine	42-inch	1
Tow tractor		3
Maintainer		2
Boring machine		1
Farm tractor	W/auger	1
Buffing tractor		2
Line detectors		4
Air Compressor	600 cfm	2
Crawler-mounted drill		2
Jackhammer		5
Tar pot	30 barrel	6
Pump	4-inch	2
Flatbed truck	Diesel, 250 hp	3
Pickup	Gasoline, 200 hp	31
Carryall		8
Stringing trucks	Diesel, 150 hp	23
Gin pole trucks		5
Bus	Gasoline, 300 hp	6
Mechanic truck		4
Skid truck		2
Dump truck	10-yard, diesel, 150 hp	1
Automobile	Gasoline, 200 hp	2
Truck	W/lowboy, diesel, 130 hp	5
Truck	W/float	1
Grease truck		1
Fuel truck		1
Office trailer		1
Warehouse trailer		2
Welding machines	Gasoline, 75 hp	12
Hot pass machine		1
Welding machine	W/wagon, gasoline, 50 hp	35
Tack machine		1
Internal lineup clamp	42-inch	2

Source: Williams Brothers Engineering Company, 1976.

The petroleum products used in constructing the pipeline section from Jal to Midland would be purchased locally and stored at the construction site.

Table 1.2.3.2-18

Fuel Use During Construction,

Jal, New Mexico, to Midland, Texas

PRODUCT	Amount Required
Diesel fuel	249,300 gals
Gasoline	85,400 gals
Lubricating oil	33 drums
Grease	1,800 lbs

Source: Williams Brothers Engineering Company, 1976.

Midland, Texas, terminal facility

Construction personnel requirements at Midland would be furnished by a local labor force. Construction time for the Midland terminal would be approximately 14 months. An estimated 104 construction personnel would be required to construct the facilities. The work schedule would be 10 hours/day, 5 days/week.

The overall duration of tank erection would be as required to coincide with the completion of the pipeline construction. Because fewer tanks would be erected at Midland than on the West Coast, personnel and construction duration would be reduced accordingly, but the same classifications would be required.

Construction equipment and operators for the Midland terminal would be provided by the construction contractors. Table 1.2.3.2-19 represents typical equipment owned by a contractor and used for tank and terminal construction. The equipment would be used for grading, constructing

foundations, welding tanks, welding manifold piping, and lifting heavy materials. The table also includes temporary office and support equipment for the equipment and operators.

Table 1.2.3.2-19

Equipment for Construction of Midland, Texas, Terminal

ITEM	Description	Number Required
Front-end loader	980, rubber-tired diesel 250 hp	2
Backhoe	1-1/4-yard, LS98, diesel, 190 hp	2
Motor crane		2
Sideboom 572	Diesel, 250 hp	2
Welding machines	Gasoline, 75 hp	5
Pickup	Gasoline, 200 hp	4
Automobile	Gasoline, 200 hp	2
Parts van	Diesel, 250 hp	1
Flatbed truck	Diesel, 250 hp	1
Truck	W/lowboy, diesel, 130 hp	1
Air compressor	600 cfm	1
Air compressor	150 cfm	1
Jackhammers		2
Tamping machine		2
Office trailer		1
Roller	10-ton, diesel, 150 hp	1
Sheepsfoot roller		1
Tractor	Gasoline, 75 hp	1
Hand compactor	Gasoline, 5 hp	1
Welding machine	W/wagon, gasoline, 50 hp	2
Motor grader	Diesel, 150 hp	1
Water truck	Gasoline, 200 hp	1
Pumps	4-inch	2
Dump truck	10-yard, diesel, 150 hp	3

Source: Williams Brothers Engineering Company, 1976.

The petroleum products would be purchased locally and stored at the construction site. Projected fuel uses for Midland terminal construction are presented in Table 1.2.3.2-20.

Table 1.2.3.2-20

Petroleum Products for Construction

Midland, Texas, Terminal Facility

PRODUCT	Amount Required
Diesel fuel	312,800 gals
Gasoline	106,400 gals
Lubricating oil	200 drums
Grease	3,400 lbs

Source: Williams Brothers Engineering Company, 1976.

Pump station construction

The 18 pump stations would be installed by five or six separate crews, with each crew constructing up to 4 pump stations. Each crew would be split up into smaller specialty crews to create a division of work at each pump station. Utilizing the division of work, one crew would handle the necessary earthwork and site preparation at each location. When this activity is near completion, another crew would move in to commence the civil construction and provide adequate supports and foundations for the buildings and mechanical equipment. When the civil construction nears completion, a different crew would move in and commence the mechanical construction and electrical installation. This type of schedule would be followed for the construction of each pump station, and it is estimated that each pump station would be completed in approximately five months, or 120 working days. The construction schedule is based on working 5 days/week, 10 hours/day.

Each crew would consist of approximately 93 personnel, but it is unlikely that all personnel would be working at one location at the same time because of the division of work. Equipment and personnel listed in the following

tables would be used for grading, building foundations, welding associated piping, compacting, constructing pump foundations, setting pumping units, and lifting heavy equipment. In addition to the facilities listed above, temporary access roads would be built by a contractor prior to pump station construction for access to and from the pump stations by construction personnel and their equipment. Native stone roads would be provided to and from each pump station after all pump station construction equipment leaves the construction sites. All incoming power transmission lines and related facilities would be provided and installed by local utilities.

Table 1.2.3.2-21 lists personnel required for construction of a typical pump station. The construction personnel would be supplied by local labor forces, if available. The working hours would be negotiable with the construction contractors. Average earnings per worker for this construction activity are expected to be $14,103. At 1976 pay scales, average weekly payroll is expected to be $54,650.

Table 1.2.3.2-21

Personnel Required for

Pump Station Construction Activity

CLASSIFICATION	Number Required
Superintendents	2
Supervisors	4
Operators	21
Teamsters	7
Welders	13
Welders' helpers	16
Laborers	30
Total	93

Source: Williams Brothers Engineering Company.

Table 1.2.3.2-22 lists equipment for construction of a typical pump station. Depending on each pump station's conditions and requirements, the station contractors may choose to use additional equipment. The construction equipment and the operators would be provided by the construction contractors.

Table 1.2.3.2-22

Equipment for Construction of a Typical Pump Station

ITEM	Description	Number Required
Motor crane		3
Sideboom	571	3
Bulldozer	D-7	2
Backhoe		6
Winch truck		2
Tractor	W/lowboy	2
Tractor	W/float	1
Dump truck	10-yard, diesel, 150 hp	2
Grease truck		1
Fuel truck		1
Parts van	Diesel, 250 hp	2
Pickup truck	Gasoline, 200 hp	4
Auto	Gasoline, 200 hp	2
Office trailer		1
Pump	4-inch	3
Welding machines	Gasoline, 75 hp	9

Source: Williams Brothers Engineering Company.

Table 1.2.3.2-23 lists petroleum products for construction of a typical pump station. The petroleum products used in constructing each station would be purchased locally, if available, for each respective pump station, and would be stored at the construction sites. Totals shown reflect one typical pump station.

Table 1.2.3.2-23

Fuel Use During Construction of Typical Pump Station

PRODUCT	Amount Required
Diesel fuel	111,000 gals
Gasoline	60,700 gals
Lubricating oil	22 drums
Grease	1,200 lbs

Source: Williams Brothers Engineering Company.

The applicant's schedule assumes that major material and equipment would be assembled for start of construction of port facilities in May, 1977, with an interim operation starting in July, 1978 when major completion of the project is projected.

Figure 1.1.2.1-1 illustrates concurrent effort in the different areas with major construction completions in January and February, 1978. Testing and final inspection and acceptance of facilities would be handled as each major item becomes operationally ready. For example, storage tanks would be inspected and tested individually at the time each tank is completed. In a similar manner, piping systems and equipment at the two terminals, the pump stations, and the main pipeline would be inspected and tested in accordance with applicable regulatory requirements and industry practices as these components are ready. This procedure would minimize delays during the final project completion stage when all of the operating components must be tested and verified to operate as elements of the overall system.

Continuous surveillance would be maintained throughout the equipment manufacturing process and during construction. The surveillance would include both factory and mill inspection. During field construction, project inspection and management personnel would be present at each active

construction area to observe and report on the quality of workmanship and conformance with specified requirements.

Materials to be permanently installed would be turned over temporarily to construction contractors at locations in each construction area. These locations would be rented, and would involve sites from 10 to 30 acres in size as needed for stockpiling materials. The sites have not been selected but may include four or five areas in California near the pipeline right-of-way. Stockpile areas in Arizona, New Mexico, and Texas would be based at existing compressor stations and maintenance areas owned by El Paso Natural Gas Company, plus rented space in Midland or Odessa Texas, to handle the 42-inch pipe to be installed from Jal, New Mexico, to Midland.

Transmission lines

Electrical power to drive the pumping units would be supplied by utility companies serving each area. Power would be delivered through an overhead electric power line to a transformer substation at each pump station site. The substations would include circuit breakers required to protect the power line and substation. The substation transformer would reduce the voltage to that required by the motors on the pumping units. The switchgear cubicle between the substation and the pumping units would provide equipment for starting and stopping the pumping units.

Data of power supply and loads at the stations are tabulated on Table 1.2.3.2-24. Because precise information is lacking on the location of the proposed power-line rights-of-way, these ancillary facilities will require supplemental environmental analysis reports when formal applications from appropriate public utility companies are made. The environmental analyses prepared at BLM district levels will include detailed consideration of impacts and alternative alignments to minimize impacts.

Table 1.2.3.2-24

Pipeline Pump Station and Power Supply Data

STATION NAME Ownership	Horsepower Requirement	Quarter Section	Section/Township/Range
Dominguez Hills Private	9,199	NW of Xing, Alameda/ Del Amo	Rancho San Pedro (Grant) T. 4 S., R. 13 W.
Redlands Private	9,203	SW/4 of NW/4	Sec. 4, T. 2 S., R. 3 W.
Indio Private	6,163	SE/4, SW/4, NW/4 SW/4, SE/4, NW/4	Sec. 29, T. 5 S., R. 9 E. Sec. 29, T. 5 S., R. 9 E.
Desert Center BLM	2,842	W/2	Sec. 25, T. 5 S., R. 15 E.
Ehrenberg BLM	8,700	NW/4 NE/4 SE/4	Sec. 8, T. 3 N., R. 21 W.
Livingston BLM	7,920	NW/4 SW/4 NE/4	Sec. 12, T. 2 N., R. 19 W.
Gila BLM	11,007	NW/4 NW/4	Sec. 19, T. 2 S., R. 5 W.
Casa Grande Private	12,747	Lot 12	Sec. 5, T. 6 S., R. 3 E.
Coolidge State	9,214	S/2 NW/4	Sec. 8, T. 7 S., R. 11 E.
Black Mountain State	9,287	S/2 NW/4	Sec. 32, T. 8 S., R. 14 E.
Redington State	9,495	SW/4 NE/4	Sec. 29, T. 12 S., R. 20 E.
Cochise Private	6,605	SW/4 SE/4 SE/4	Sec. 14, T. 13 S., R. 29 E.
Lordsburg Private	11,032	NW/4 SW/4 SW/4	Sec. 9, T. 23 S., R. 17 W.
Deming Private	7,522	SE/4 NW/4 NW/4	Sec. 9, T. 24 S., R. 9 W.
Anthony Private	9,371	SW/4 SE/4 SW/4	Sec. 14, T. 26 S., R. 3 E.
El Paso Private	9,786	NW/4 NW/4	Sec. 8, T. 1 S., Blk 77, T&P RR
Guadalupe Private	3,632	NE/4 NW/4 NW/4	Sec. 5 Blk, 119 P. S. L.
Pecos BLM	5,957	NW/4 NW/4 NE/4	Sec. 9, T. 26 S., R. 29 E.

Source: Williams Brothers Engineering Company.

The terminals, pump stations, and support facilities would rely on electrical energy supplied by the following utility companies:

Southern California Edison Company
Arizona Public Service Company
Sulphur Springs Valley Electric Cooperative, Inc.
San Carlos Irrigation District
Community Public Service Company
Public Service Company of New Mexico
El Paso Electric Company
Rio Grande Electric Cooperative, Inc.
Southwestern Public Service Company
New Mexico Electric Service Company
Texas Electric Service Company

California

Southern California Edison Company would serve the proposed Long Beach Port, Dominguez Hills Pump Station and terminal facilities, and three proposed pump stations at various locations in California.

Service would be accomplished by tapping existing transmission lines, then extending new transmission lines to the proposed terminal facilities and pump station locations. The new facilities would be designed to provide sufficient power on a reliable basis to serve the estimated load requirements within the utility-imposed operating parameters.

The initial design studies have indicated the following power transmission line locations. However, further study and some existing environmental studies may preclude these locations, causing relocation of the power-line taps and a change in lengths of transmission lines.

Port and Pier J terminal facilities. Southern California Edison Company would serve the Port and Pier J terminal facilities by extending an existing 66 kilovolt (kv) line. The new line would be constructed from a point approximately .5-mile from Pier J and extend to the new substation required to serve the facilities.

Proposed Dominguez Hills terminal

The proposed Dominguez Hills terminal would occupy an area of approximately 69 acres. The facility would include two 615,000-barrel floating-roof tanks with associated pumps, manifold piping, valves, meters, and communication systems capable of initiating transfer of the 500,000 barrels of crude oil per day to Midland, Texas. Electrical power to operate this station would be provided by Southern California Edison Company. The applicant has not indicated the location of the substation electrical tap.

Redlands and Desert Center pump stations. Southern California Edison Company would serve both pump stations by tapping existing 66 kv lines.

The proposed Redlands Pump Station would be served by tapping an existing 66 kv line and constructing 2.7 miles of new transmission line from the north. The proposed Desert Center Pump Station would be served by tapping an existing 66 kv line and constructing 11.8 miles of new transmission line, also from the north.

Rights-of-way for access roads would be required for construction and maintenance on the Redlands and Desert Center lines.

Indio Pump Station. This station would be served by the Southern California Edison Company through an existing 230 kv transmission line. The transmission facilities would require an estimated 150-foot-wide easement.

Arizona

In the southern half of Arizona, eight pump stations would be located at varying intervals along the existing El Paso Natural Gas Company pipeline. Arizona Public Service Company would serve four of the proposed pump stations, with Sulphur Springs Valley Electric Cooperative, Inc. serving two and San Carlos Irrigation District serving two. Construction of new transmission facilities to serve the proposed pump stations would be necessary because of the lack of suitable facilities adjacent to the proposed pump station sites.

The proposed transmission facilities would be designed to provide the pump stations with sufficient power on a reliable basis to serve the estimated load requirements. Power for the pump stations would be delivered at one of three voltage levels: 115 kv, 161 kv or 230 kv. Service at these varying levels would be required because of existing voltage levels of the nearest suitable source.

The types of structures to be utilized in the construction of the proposed transmission facilities are similar. The mechanical differences are a result of the greater phase-to-phase and ground clearances required whenever voltage levels are increased.

The following descriptions indicate the location of each proposed tap station and pump station and the preferred routes of the proposed transmission facilities to each pump station.

Ehrenberg and Livingston pump stations. Both stations would be served by Arizona Public Service Company from a single tap section. This tap section would be installed in an existing 161 kv line operated by the U.S. Bureau of Reclamation. The line extends from the Parker Dam area to Yuma, Arizona. The proposed tap station is located approximately 9 miles south of Quartzsite.

The proposed transmission line would extend west-northwesterly in an existing corridor which contains the existing El Paso Natural Gas Company pipeline. At a point approximately 6 miles northwest of the proposed tap station, the line would enter a canyon leading to Copper Bottom Pass, then exit the Dome Rock Mountains through the La Paz Arroyo. The line would then turn west to the site of the Ehrenberg Pump Station. The approximate length of this H-frame line would be 16 miles. Access to Ehrenberg Pump Station would be from Interstate 10 via Tom Wells Road.

The proposed transmission facilities to Livingston Pump Station would extend southeast from the tap station to the pump station site, which would be just west of the western boundary of the Kofa Game Range. The 50-foot corridor would be along the existing pipeline. Approximate length of this H-frame line would be 3 miles.

Gila Pump Station. The Gila Pump Station would be served by Arizona Public Service Company from a switching station in the proposed Arizona Public Service Liberty-to-Gila Bend 230 kv line. The switching station would be located where the proposed Arizona Public Service 230 kv line crosses the existing El Paso Natural Gas Company pipeline right-of-way approximately 1.5 miles east of Arizona 80.

The transmission facilities would share a corridor, which is adjacent to the El Paso Natural Gas Company pipeline right-of-way, with two of the proposed 500 kv transmission lines from the proposed Palo Verde Nuclear Generating Station. This segment of the corridor would parallel the pipeline for approximately 8.5 miles to the Gila River. At this point, the transmission line would cross the river and proceed approximately 3 miles northwesterly to the site of the Gila Pump Station. Approximately 12 miles of 230 kv line would be required to serve this pump station site. Access would be via a road from the existing Gila compressor station operated by El Paso Natural Gas Company.

Casa Grande Pump Station. The Casa Grande Pump Station would be served from the existing Santa Rosa electrical substation located in the SW/2 Section 30, T. 5 S., R. 42, approximately 15 miles west of the city of Casa Grande. No separate tap station would be required to provide the new service, but the existing Santa Rosa substation would be expanded by the addition of a new bay. This new 230 kv transmission line would extend south from the existing Santa Rosa substation to a point approximately 1.5 miles west of Parker Road to a point near the intersection with Miller Road. The transmission line would turn west paralleling Miller Road for approximately 4 miles then proceed south approximately .7-mile to Green Road and the Casa Grande Pump Station site. Access would be along the existing road bordering the compressor station.

Coolidge Pump Station. At the time of this writing, the Coolidge Pump Station would be served by the Bureau of Indian affairs (BIA) from a switching station in the existing 115 kv line from Coolidge to Oracle Junction. The proposed 115 kv line to serve the pump station would extend southwesterly across the Pinal-Pioneer Parkway to the pump station site. Length of the transmission line would be approximately 1.2 miles. An access road approximately .5-mile in length would have to be constructed from an existing road connecting to Arizona 80.

Black Mountain Pump Station. At the time of this writing, the Bureau of Indian Affairs (BIA) proposes to install an addition to their Oracle substation. The proposed new transmission line would extend northwest for approximately 7 miles in a corridor approximately 1 mile wide. Access to the facilities would be by improving an existing ranchers' road.

Redington Pump Station. Sulphur Springs Valley Electric Cooperative, Inc. would install a tap station on an existing 115 kv line about 5 miles west of the Redington Pump Station. From this point approximately 5 miles of new 115 kv H-frame line would be installed to provide service to the pump

station site. Access would be by improving 6 miles of road to connect to the San Pedro Valley.

Cochise Pump Station. Thirty miles of 230 kv line would be installed by Sulphur Springs Valley Electric Cooperative from Red Tail substation west of the pump station site. Approximately 2 miles of road would need to be improved to provide access from Interstate 10.

New Mexico

Lordsburg Pump Station. This pump station would be served by Community Public Service Company which proposes to extend a 115 kv transmission H-frame line from its Hidalgo substation site southward approximately 6 miles to the pump station site. Access would be from the existing Lordsburg Compressor Station operated by El Paso Natural Gas Company.

Deming Pump Station. The Deming Pump Station would be served by Community Public Service Company of New Mexico which proposes to extend a 115 kv line from the Hermanas substation. The proposed transmission facilities would extend to the west approximately .7 mile to the proposed pump station site. Access would be from a county road bordering the proposed pump station site.

Anthony Pump Station. The Anthony Pump Station would be served by El Paso Electric Company from a tap station installed in an existing 115 kv line from Newman to Arroyo. The proposed transmission facilities would extend to the west approximately 2 miles to the proposed pump station site. Access would be by the county road bordering the proposed site.

Texas

El Paso Pump Station. The El Paso Pump Station would be served by El Paso Electric Company from a tap station installed in the existing 69 kv line from Lane substation to Dell City. These transmission facilities would have to be converted from 69 kv to 115 kv because of the additional loads to be imposed by the El Paso and Guadalupe pump stations. The transmission facilities are already capable of operating at the 115 kv level; however, the conversion would require the Lane, Dell City, and Shell substations to be converted to 115 kv operation. This could be obtained by replacing the transformers, breakers, switches, and associated equipment. The proposed tap station would be used for metering and isolating fault portions of the Lane to Dell City transmission line. The proposed facilities would extend to the north approximately 10 miles to the proposed El Paso Pump Station site. An access road would be constructed by improving the pipeline road from the county road 2 miles to the east.

Guadalupe Pump Station. The Guadalupe Pump Station would be served by the Rio Grande Electric Cooperation, which proposes to construct 16 miles of new 115 kv transmission line from existing facilities serving the Dell City substation to the site of the proposed pump station. This new line would provide service through a tap station on the Lane to Dell City transmission line. The tap station would be located just north of U.S. Route 62. The new line would extend eastward from the tap station to the proposed pump station site. Access to the proposed facilities would be from U.S. Route 62.

New Mexico

Pecos Pump Station. This pump station would be served by Southwestern Public Service Company from a new 115 kv bay in the existing Potash Junction substation. The proposed transmission facilities would extend to the south approximately 31 miles to the proposed pump station site. An access road

would be constructed by improving 1 mile of pipeline road from the Pecos River.

Jal, New Mexico. The site at Jal would be acquired and utilized for installation of a scraper launcher and receiver as well as the takeoff location for the connection to the Jal transfer station. The Jal transfer station will be served from the existing electrical facilities installed at the Texas/New Mexico tank farm and supplied by New Mexico Electric Service Company.

The Jal and Ector takeoffs will not have large motors and will only require three-phase, 480-volt service, which will be supplied by New Mexico Electric Service Company and Texas Electric Service Company, respectively. No significant new construction requirements are anticipated.

Ector transfer station. The Ector transfer station power requirements would be served by Texas Electric Service Company from facilities presently installed at the Exxon tank farm.

Midland, Texas terminal facility. The Midland terminal facility would be served by Texas Electric Service Company from an existing 138 kv line located along a section line road immediately east of the terminal site. The line would be extended west from the section-line road to just north of the terminal site, then south to the substation. Total length of the extension is approximately 4,500 feet. This site will require medium voltage service. It will also be serviced by Texas Electric Service Company and will require the construction of approximately 0.5 miles of 138 kv H-frame transmission line.

Communication systems

The terminal would be served by the pipeline microwave network and the public telephone network. The microwave network would provide channels for voice and data communications to other facilities on the system including an operations center at El Paso, Texas (Table 1.2.3.2-25).

The communications systems would link all operating locations and areas with voice, teleprinter, or data channels as required for administration and operation. Each major facility would be served by the optimum mix of communications channels. Where remote control and line integrity monitoring are involved, high reliability would be the critical criterion. In all cases an attempt would be made to use existing facilities if all major design criteria could be satisfied.

Pier J. The Pier J area would have communications circuits installed to provide channels for telephone service and controls. This private telephone network would connect the control center to each ship berth and the tank area. The control channels would connect the three dispersed remote terminal units to the master terminal unit located in the control center.

The terminal facility would be the base of operations for crude oil receipts from the pipeline system and deliveries into the distribution networks. Tank allocation, manifold valve lineup, and booster pump operation would be controlled within the terminal. A two-way radio system also would be installed to provide voice communications between the control center and key personnel (including the dockmen) and the ships' officers.

Intermediate terminal and initial pump station. Communications between this location and the Pier J area would be provided by microwave or channels leased from the telephone company. Channels would be provided for voice and data communications. The initial pipeline system pump station would be equipped with a microwave terminal to provide it with microwave channels to

Table 1.2.3.2-25

Microwave Communications Facilities

SITE	Coordinates Latitude Longitude	Section/Township/Range	Antenna Tower Height (feet)	Antenna Diameter or Reflector Size (feet)
Dominguez Hills	33° 50' 53" 118° 13' 35"	Rancho San Pedro (Grant) T.4 S, R.13 W	60	8
Redlands Pump Station	34° 01' 43" 117° 12' 21"	Sec. 4, T.2 S, R.3 W	20	8
Redlands Passive Repeater	34° 01' 40" 117° 12' 34"	Sec. 5, T.2 S, R.3 W		14 by 16
Indio Pump Station	33° 42' 30" 116° 04' 22"	Sec. 29, T.5 S, R.9 E	60	8
Desert Center	33° 42' 30" 115° 22' 36"	Sec. 25, T.5 S, R.15 E	30	12
Desert Center Passive Repeater	33° 39' 20" 115° 26' 53"	Sec. 8, T.6 S, R.15 E		30 by 32
Ehrenberg Pump Station	33° 36' 56" 114° 26' 37"	Sec. 8, T.3 N, R.21 W	250	12
Livingston Pump Station	33° 31' 57" 114° 10' 18"	Sec. 12, T.2 N, R.19 W	20	12
Livingston Passive Repeater	33° 40' 05" 114° 21' 48"	Sec. 19, T.4 N, R.20 W		16 by 24
Gila Pump Station	33° 14' 36" 112° 48' 24"	Sec. 19, T.2 S, R.5 W	20	6
Casa Grande Pump Station	32° 55' 48" 112° 03' 51"	Sec. 5, T.6 S, R.3 E	20	6

Table 1.2.3.2-25 (Continued)

SITE	Coordinates Latitude Longitude	Section/Township/Range	Antenna Tower Height (feet)	Antenna Diameter or Reflector Size (feet)
Coolidge Pump Station	32° 50' 18" 111° 14' 20"	Sec. 8, T.7 S, R.11 E	40	6
Black Mountain Pump Station	32° 41' 38" 110° 55' 34"	Sec. 32, T.8 S, R.14 E	20	6
Redington Pump Station	32° 21' 47" 110° 19' 35"	Sec. 29, T.12 S, R.20 E	20	6
Cochise Pump Station	32° 17' 36" 109° 21' 05"	Sec. 14, T.13 S, R.29 E	20	6
Lordsburg Pump Station	32° 18' 55" 108° 36' 15"	Sec. 9, T.23 S, R.17 W	20	15
Lordsburg Passive Repeater	32° 18' 26" 108° 24' 00"	Sec. 17, T.23 S, R.15 W		24 by 30
Deming Pump Station	32° 14' 08" 107° 47' 04"	Sec. 9, T.24 S, R.9 W	100	6
Anthony Pump Station	32° 02' 23" 106° 36' 36"	Sec. 14, T.26 S, R.3 E	40	6
El Paso Pump Station	31° 55' 38" 106° 04' 56"	Sec. 8, T.1 S, Blk. 77, T&P RR	20	10
El Paso Passive Repeater	31° 56' 57" 106° 05' 09"	Sec. 21, Blk. 1, P.S.L.		16 by 20
Guadalupe Pump Station	31° 46' 00" 104° 54' 55"	Sec. 5, Blk. 119, P.S.L.	20	6
Pecos Pump Station	32° 03' 50" 103° 59' 16"	Sec. 9, T.26 S, R.29 E	80	6

Table 1.2.3.2-25 (Continued)

SITE	Coordinates Latitude Longitude	Section/Township/Range	Antenna Tower Height (feet)	Antenna Diameter or Reflector Size (feet)
Jal future pump station site	32° 03' 54" 103° 12' 55"	Sec. 12, T.26 S, R.36 E	175	6
Ector transfer point	32° 02' 06" 102° 30' 16"	Sec. 26, T.1 N, Blk. 43, T&P RR	20	6
Midland terminal	31° 59' 44" 102° 02' 20"	Sec. 43, T.1 S, Blk. 38, T&P RR	50	6

the pipeline communications system. Pier J communications channels would be tied into the pipeline communications system through these facilities.

Pipeline. The proposed pipeline communications system would be based on a highly reliable, privately owned microwave system being installed on a route which coincidentally parallels the pipeline route. This microwave system is jointly owned by Union Oil Company and Motorola, Inc. It is commonly referred to as the LAH (Los Angeles to Houston) system. This system was designed and built with the intention of sharing channels with other potential users. To provide the connections between the pipeline facilities and the LAH system, it will be necessary to construct spur links which are microwave circuits that tap off of the backbone system at existing microwave repeater sites and terminate at the pipeline sites. New facilities to be constructed would consist of antenna towers with microwave dish type antennas at each pump station, terminal, and delivery point. The radio equipment at each of these locations would consist of several cabinets of electronics. These cabinets would be housed in the same building with the control equipment except at the Ehrenburg Pump Station where, due to the height of the tower (250 feet) and the resulting requirement for a guyed tower, a separate communications equipment shelter would be required.

In addition, five passive repeaters would be erected at locations away from the pipeline facilities. There are billboard-like reflectors, ranging in size from 14 feet by 16 feet up to 30 feet by 32 feet. The reflectors are used to bounce the microwave signals around obstructions. They require no power or access roads.

The completed communications system would interconnect the pipeline control center with all of the pump stations as well as the West Coast terminal facilities and the Midland terminal.

The design of this communications system provides for a propagation reliability of 99.9996 percent. To ensure the maximum reliability of the

system, the electronic equipment would be duplicated at each site and would operate in the "hot standby mode," which means that if one unit fails, the backup unit would immediately take over. In addition, key parameters of all the electronics equipment would be continuously monitored by a computer-based alarm system. This system would report any indications of equipment problems or power failures to communication systems centers located in Los Angeles and Phoenix. These centers would be operated by Union Oil Company and Motorola, Inc., and would be manned 24 hours a day, 365 days a year. A team of microwave radio technicians, assigned exclusively to the maintenance of the microwave system, would be stationed at maintenance base locations along the main-line route.

These channels would be used for voice communications between these facilities, data communications for the Supervisory Control and Data Acquisition (SCADA) System, teletype, and data communications between the terminals and the El Paso operations center.

The maintenance system bases would utilize the public telephone network or leased telephone channels as their primary means of point-to-point communications.

Mobile radio system. A two-way radio system would provide voice communications between the maintenance bases and various vehicles and other maintenance equipment in the area. Wherever practical, existing fixed stations would be used. All currently proposed fixed stations would be installed at existing radio facilities, thereby eliminating the requirement for additional antenna towers.

Control systems

The central control system would be located in an office building near the storage tank area. The system would receive and visually display the command and status information in the control room. Terminal operators

would use displays with flow diagrams to monitor and control the terminal and related facilities on a 24-hour basis.

Two functionally independent control systems would acquire data and provide open-loop control for oil movements from the tankers berthed in San Pedro Bay to storage onshore in the West Coast terminal, from terminal tankage to the pipeline and local distribution networks, and from the primary pipeline system to storage at Midland. (Open-loop control requires decisions by a dispatcher; complete control by a computer is closed-loop operation.) Oil movements from the Midland terminal to existing pipeline systems would be incorporated into the computerized network of this proposed project.

Each independent control SCADA System consists of one master terminal unit and several remote terminal units which could shut down the entire pipeline system within 10 minutes, if necessary.

The master terminal unit would be equipped with a computer and cathode ray tubes as well as other visual displays and keyboards for system control. Peripheral equipment such as loggers, card-tape readers, and keypunch machines would be included for master terminal unit support. An uninterruptible power supply would be used for the primary power supply with a standby emergency generator for power in the event of a failure. The master units would be housed in areas with a controlled environment, and would require an area of approximately 1,000 square feet.

The remote terminal units would have solid state circuitry but would not include a computer. Each unit would be located in the buildings containing the electrical equipment required to control and/or monitor the oil movement. The remote units also would be housed in a controlled environment, and would require an area of approximately 6 square feet.

A master terminal unit would be installed at the West Coast terminal and on the pipeline system at El Paso.

Control system at the West Coast terminal. A SCADA System (System A) would be installed at Long Beach Port for monitoring the tanker unloading systems and for controlling and monitoring the terminal operations at Long Beach and Dominguez Hills.

The control center would be located at the Long Beach terminal and would be provided with communication links to all remote terminal units. One remote terminal unit would be located at each of the three tanker unloading berths, and at the metering facilities, and valve manifold/booster pump facilities. One or more remote terminal units would be located in the storage tank areas. A dispatcher would directly control all of the terminal operations at both the port and Dominguez Hills terminals except for operations on the berths. The berths will be manned and locally controlled. The pipeline pumping operations at Dominguez Hills terminal would be controlled by System B described below.

A dispatcher would control all of the terminal operations with assistance from the master terminal unit computer except for the unloading arms at the tanker berths and the first main-line station (Dominguez Hills terminal).

Control system at El Paso. The second SCADA System (System B) for the pipeline system would be located at the operation center in El Paso.

Each remote terminal unit would be communicating with the master terminal unit at El Paso. One remote terminal unit would be located at each pump station, the Jal and Ector transfer stations, and at the Midland terminal facility. The master terminal unit would be in continuous communication with the remote terminal units via the microwave communications network. The master terminal unit also would receive information directly from the System A master terminal unit located in the Long Beach terminal.

System B would monitor and control the booster pumps and valves required for tank storage and distributing the oil into the existing tanks at Jal, the

existing tanks and pipeline system at Ector, and the existing pipeline system in Midland.

System B would monitor and control all pump station main-line pumping units and certain valves in the pump stations and on the pipeline. In addition, it would monitor and control all routine operations at the takeoff points and at the Midland terminal.

Logic systems. The computers associated with the two master terminal units would be programmed to control, monitor, and perform certain operational decisions with information transmitted between the master terminal unit and the remote terminal unit over the communications system.

In addition, each pump station would have its own logic system to perform start-stop sequence functions (as directed by the central system) and to provide all automated protective functions independently of the central computer system. These local logic control systems, which would utilize modern programmable controllers, would allow the pump stations to continue to operate safely in the event of a failure in the meter terminal or the communications system. When ordered by the protective system, shutoff time for each valve would range from three to eight minutes.

Actions following construction

Testing

In addition to standard mill testing of all pipe and fittings, hydrostatic testing would be performed after construction and before the line was placed in crude oil service. The hydrostatic test would be conducted in accordance with requirements of Department of Transportation, Office of Pipeline Safety, Part 195, Title 49, Code of Federal Regulations, ANSI B31.4 (Liquid Petroleum Transportation Piping Systems). Applicable state and local regulations also must be followed.

Basically, the hydrostatic test involves filling the line with a suitable liquid test medium, in this case fresh water, then increasing the pressure by means of a special pump and pressurizing the test sections until a predetermined internal pressure is achieved. This pressure would be 1.25 times the pipeline internal design pressure. Such tests are designed to prove that the pipe, fittings, and weld sections would maintain mechanical integrity without failure or leakage under pressure conditions at least 25 percent more severe than those encountered during normal operation.

In addition to all sections of new construction, all of the approximately 120.4 miles of Southern California Natural Gas line and approximately 139 miles of El Paso pipeline to be utilized would undergo hydrostatic testing. Table 1.2.3.2-26 indicates the preliminary proposed sources, disposition points and amounts of water to be utilized. Wherever possible water would be moved from one section of the pipe to the next for testing. In all cases water would be taken under contract or permit from sources at a rate authorized by the public or private owner involved.

Table 1.2.3.2-26

Hydrostatic Test Water Source and Disposition Points[a]

SECTION	Mileage	Source Location	Discharge Location	Barrels of water[b] Required[c]
Long Beach Terminal to Dominquez Hills	9.6	Municipal at Pier J	Transfer to next section	113,500
Dominquez Hills to Downey Area	6	Transferred from previous section	Los Angeles River at end of section	54,300[d]
Downey Area to Pomona Station	25.4	Municipal at beginning of section	San Jose Creek near Pomona Station	229,900
Pomona Station to Redlands Station	41.1	Municipal at beginning of section	Transfer to next section	372,000
Redlands Station to So.Cal. Gas line tie-in	11	Transferred from previous section	San Timoteo Creek at end of section	99,600[d]
So. Cal. Gas line tie-in to Ford Dry Lake area	120.4	Colorado River Aquaduct at Desert Center area	Colorado River Aquaduct at source point	527,900
Ford Dry Lake Area to Ehrenberg station	37.1	Colorado River at pipe-line crossing	Colorado River at source point	336,700
New construction between Livingston and Gila Stations	34.2	Private wells, near Ehrenberg Station	Private ponds at source point	150,000

Source: Williams Brothers Engineering Company.

[a] Specific source and disposition points subject to change.

[b] Approximately 10,000 barrels equal 1 acre foot.

[c] Amount of water disposed assumed to roughly equal amount obtained.

[d] Water obtained from adjacent section.

Table 1.2.3.2-26 (Continued)

SECTION	Mileage	Source Location	Discharge Location	Barrels of water Required
Cornudas area to Guadalupe Pass	41.5	Private ponds near Guadalupe Station	Same as source point	183,400
Guadalupe Pass to Jal	98.2	Pecos River at crossing point	Same as source point	428,600
Jal to Winkler-Ector Co. line	24	Transferred from next section	Through private holding tanks and ponds into natural drainage at Midland	165,600[d]
Winkler-Ector Co. line to North Cowden area	14	Transferred from next section	Transferred to previous section	212,000[d]
North Cowden area to Midland	25.1	Municipal at Midland	Transferred to previous section	284,200

Prior to the disposal of hydrostatic test water, it would be sampled and analyzed to determine the level of contaminates. Water not in compliance with Federal or state water quality standards would be impounded in holding basins approved by the appropriate governing agency. The water would be held for treatment as required in the area where discharge would take place.

Permanent records would be kept on each hydrostatic test. This record would indicate the exact location of the test segment, elevation profile, description of facility, and continuous pressure and temperature of line throughout the test. Deadweight testers would be used to verify accuracy of pressure recording devices and charts during test. A more detailed description of the proposed hydrostatic test procedure, which is in draft form at this time, is contained in Appendix A1.2.3.2.

Cleanup and restoration

Right-of-way cleanup and restoration of new rights-of-way would conform to all applicable laws, rules, and guidelines of government agencies having jurisdiction.

Right-of-way would be cleaned up by removal and disposal of construction debris and surplus materials. Considerable restoration of the right-of-way surface would be accomplished during backfilling operations. Disc harrows or other equipment would be used to break up clods and smooth the land surface where required.

Tillable land would be restored so that normal cultivation could be resumed. Where necessary, the backfilled pipeline trench would be compacted along new pipeline segments.

Temporary openings in fences would be removed, necessary gates installed, and fences restored to their original condition insofar as practical. Markers showing exact locations of pipelines would be installed at road and fence crossings. Markers also would identify owners of the pipeline and would contain other required and pertinent information, such as kinds of material transported and location and telephone number of owner in case of emergency.

From this point in the cleanup and restoration operation, each treatment may be specific to given points along the right-of-way. Further restoration procedures may be determined by a combination of five factors:

1. Preconstruction conditions.

2. Existing land use plans.

3. The requirements of the owner and/or controller of the land.

4. The techniques used in the clearing and installation phases of construction.

5. The program for maintenance of the operating right-of-way and ancillary facilities.

The relative importance of each factor at each location would depend on the local circumstances. The following considerations may be applied in determining the restoration procedures:

1. Disturbed areas would be restored as closely as practical to their original condition before construction, where this does not interfere with the primary functions of the right-of-way.

2. Land use plans may allow for, or require, the restored areas to exhibit characteristics different from the preconstruction conditions.

3. In cases of public land, all appropriate regulations and guidelines would be followed. Restoration of privately owned lands may be based, at least in part, on needs of the landowner.

4. The technique used in clearing and installation often will determine the techniques and extent of restoration required.

5. The program of maintenance often will determine the techniques and extent of restoration also.

Several approaches to restoration are available. These may be used separately or in various combinations. The choice would depend on the factors listed above. The most common available approaches include the following:

- Surface contouring
- Removal of debris
- Surface cultivation
- Mulching
- Structures
- Chemical treatments (adhesives)
- Chemical treatments (neutralizers)
- Chemical treatments (fertilizers)
- Replanting

These approaches generally will be considered under various land use types and would be subject to modification based on further studies.

<u>All land-use types</u>. In all land-use types, restoration would follow Pipeline Construction Specifications, usually beginning with the disposal of debris and the restoration of normal contour and surface soils. Surface contouring and terracing, and certain structures, would be used as diversions to concentrate and/or channel surface water flow. Where appropriate, topsoil would be returned to cover the trench backfill material.

<u>Barren lands</u>. Mulching would be practiced to prepare seedbeds and control erosion. Fertilizers would be applied where appropriate. For the stabilization of critical areas, spray-on adhesives would be used. Revegetation programs would be based on well-accepted guidelines as noted earlier.

<u>Forest and woodland</u>. Mulching would be practiced, where appropriate, to prepare seedbeds and control erosion. Fertilizers and spray-on adhesives would be utilized on local sites. Revegetation programs would be based on well-accepted guidelines as noted earlier.

Improved pasture and cultivatable lands. Typically, these lands are privately owned. Therefore, their restoration would be based on preconstruction agreements with the landowner. Restoration beyond normal cleanup procedures often is accomplished by the landowner during his normal agricultural operation.

Rights-of-way. Restoration of the pipeline right-of-way would be modified when coincident with or crossing other rights-of-way.

Where electric transmission line rights-of-way are encountered, restoration programs would conform to those for the land use type on which the encounter occurs, to those of the preexisting right-of way, or to a program devised with the operator of the preexisting right-of-way, as appropriate.

The crossing of certain minor roads would be accomplished by trenching. In such cases, restoration of the road margins would follow the above guidelines, and restoration of the roadway itself would conform to the laws, regulations, and guidelines of the government agency having jurisdiction, or to the needs of the owner, as appropriate.

Streams. Restoration of the right-of-way where it crosses a stream would emphasize stream-bank stabilization. This stabilization would involve mulches, spray-on adhesives, and/or revetment structures, where appropriate.

Ancillary facilities. Pump stations, permanent access roads, and valve stations would be restored to ensure soil stabilization and minimize impact on the landscape. Each case treated would be based on the characteristics of the site and the operational needs of the site.

Temporary support facilities. Temporary access roads, staging and assembly areas, and other temporary installation support areas would be restored based on normal techniques of abandonment. Upon abandonment, such areas

would be stabilized without undue delay, and the land would be returned to the original owner or controller.

Inspection. All phases of pipeline construction would be subject to inspection in the field. Inspectors who are specialists in a certain construction category would be assigned to inspect all the work done in that area during the job.

Under the contract specifications, the company would reserve the right to inspect the work at all stages, and would require that the work be conducted in a manner that would permit and facilitate this inspection. Inspectors who are not contractor-associated would be authorized to reject the work and to require correction at any time when results have not met or obviously would not meet specifications. In addition, compliance checks would be performed independently by such agencies of the Federal, state, and local governments as have discretionary permit authority.

1.2.3.3 Operation

The operation of the proposed pipeline system would be accomplished by a permanent staff of trained personnel. Prior to starting the system, personnel would undergo a training and familiarization program to acquaint them with the entire pipeline system. Operating personnel would be trained to operate onshore crude oil handling equipment, pump station equipment, terminal facilities, and a related safety program. Operations manuals, equipment manuals, and periodic updates in the training would be used to aid in performing the required duties.

The oil spill contingency plan for the Long Beach area terminals outlines responses for spills occurring within San Pedro Bay, the Pier J terminal, and from the tank transfer line which connects the marine terminal with the Dominguez Hills inland terminal. The oil spill contingency plan for the

pipeline outlines responses for oil spills originating from the pipeline between the Dominguez Hills terminal and the Midland terminal.

The pipeline contingency plan is divided into five operational units called districts which are based upon the location of the five permanent maintenance bases situated along the pipeline route. The plan ties the response levels into a functional unit by providing background information on oil spill response techniques and additional support.

Oil spill response actions fall into the following primary categories:

1. Immediate response actions.
2. Containment actions.
3. Management actions.
4. Operations actions.
5. Support actions.
6. Advisory actions.

Immediate response actions include alert and notification procedures, pipeline operational actions, reconnaissance, control actions, protection actions, and documentation. Containment actions for segments include drainage description, major access, and the actions themselves.

This plan must be approved by the Environmental Protection Agency and authorities of the respective states prior to the start of the system. The plan is still in draft stage. Copies of the Oil Spill Contingency Plan will be available at offices of the appropriate regulating agency (see Table 1.3.1-1) and at major cities, municipal engineering offices along and near the pipeline route. Operations of the proposed project would be centered at the Long Beach Port and Dominguez Hills terminal on the West Coast and in El Paso, Texas.

Routine pipeline dispatching and operations would be based at the Operations Center in El Paso. The pump stations would be designed for unattended operation with remote control from the control center where dispatchers would adjust flow rates and monitor the operation in accord with crude oil movement requirements.

The chief dispatcher and operating manager would coordinate daily crude oil movements with outside entities regarding tanker movement and oil deliveries at the West Coast, the transfer stations at Jal and Ector, and the Midland terminal.

Operating personnel, including administration and management at the Texas headquarters, would total less than 100 people. Table 1.2.3.3-1 depicts anticipated personnel required for operation and maintenance of the West Coast terminal facilities.

Table 1.2.3.3-1

Personnel Required for Operation and Maintenance of West Coast Terminal Facilities

PERSONNEL CLASSIFICATION	Number Required
Operating management	
Terminal superintendent	1
Secretary	1
Pier operations	
Marine superintendent	1
Loading master	1
Berthing supervisors	5
Loading arm operators	10
Berthing crews	15
Terminal operations	
Supervisor	1
Chief dispatcher	1
Dispatchers	5
Operating supervisor	1
Shift operators	2
Documentation clerks	5
Laboratory technicians	5
Clerk typists	3
Maintenance	
Maintenance supervisor	1
Mechanical supervisor	1
Pump maintenance specialist	1
Meter maintenance specialist	1
Communications technician	1
Electrical/Instrument technician	1
Maintenance technicians	5
Building maintenance personnel	3

Table 1.2.3.3-1 (Continued)

PERSONNEL CLASSIFICATION	Number Required
Maintenance (Continued)	
Gate operators, main terminal	3
Corrosion engineer	1
Welder	1

Source: Williams Brothers Engineering Company.

Operation and maintenance of pipeline and pump station facilities

Five maintenance bases at intermediate locations along the pipeline would be fully equipped to handle major overhauls of pumping units, valve repairs, meter maintenance and communications maintenance, and would be capable of handling emergency repairs in their respective areas (Figure 1.2.3.3-1). In addition, the pipeline control center at El Paso would include engineering and technical specialists needed periodically to handle special problems in all areas. Total maintenance personnel required at the maintenance bases would be approximately 60.

Extraordinary maintenance and repair jobs may be performed by maintenance contractors. These contractors would be qualified similarly to construction contractors, and their work would be inspected and accepted by assigned personnel representing the pipeline owner. Tentatively, it is expected that access roads to pump stations and along the pipeline right-of-way would be maintained and repaired or improved by the use of contractors with their own equipment and personnel. There would be relatively small crews working in each area. Table 1.2.3.3-2 lists the personnel requirements for operating and maintaining these facilities.

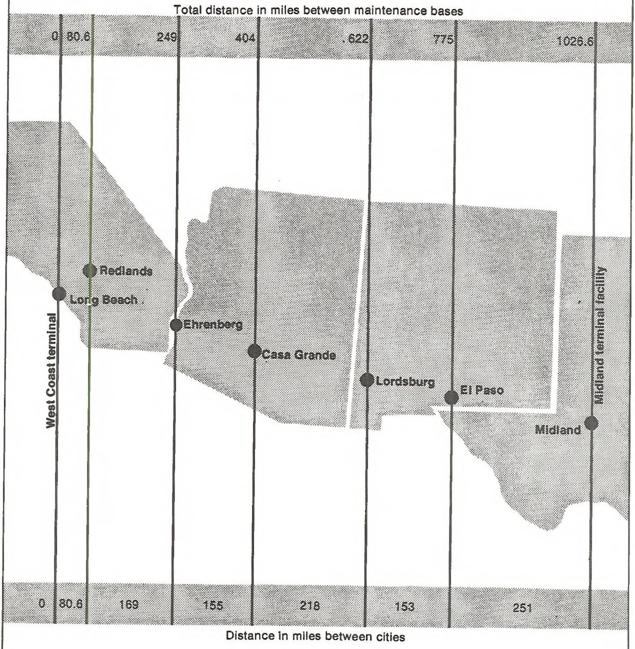


Figure 1.2.3.3-1 Pipeline areas and mileages patrolled by each maintenance base

Table 1.2.3.3-2

Personnel Required for Operation and Maintenance

of Pipeline and Pump Station Facilities

PERSONNEL CLASSIFICATION	Number Required
Operating personnel at El Paso	
Superintendents	2
Secretaries	2
Clerks	2
Office engineers	2
Corrosion engineers	2
Communications technicians	2
Redlands maintenance office	
Maintenance supervisor	1
Welder	1
Maintenance technicians	6
Mechanical technician	1
Corrosion technician	1
Electrical technician	1
Blythe maintenance office	
Maintenance supervisor	1
Welder	1
Maintenance technicians	4
Mechanical technician	1
Corrosion technician	1
Electrical technician	1
Casa Grande maintenance office	
Maintenance supervisor	1
Welder	1
Maintenance technicians	6
Mechanical technician	1
Corrosion technician	1
Electrical technician	1

Table 1.2.3.3-2 (Continued)

PERSONNEL CLASSIFICATION	Number Required
Lordsburg maintenance office	
Maintenance supervisor	1
Welder	1
Maintenance technicians	4
Mechanical technician	1
Corrosion technician	1
Electrical technician	1
El Paso maintenance office	
Maintenance supervisor	1
Welder	1
Maintenance technicians	4
Mechanical technician	1
Corrosion technician	1
Electrical technician	1

Source: Williams Brothers Engineering Company.

The flow through the pipeline would be adjusted as required to meet the overall throughput requirements. The applicant has not determined the exact pipeline pressure but has advised that the pressure would be variable along the system depending upon the gradients and throughput. Surveys would determine the actual gradients and throughput at the construction start-up. The pipeline pressures would not exceed the testing or operating codes as specified by the Department of Transportation. Adjustments could be made from a minimum of approximately 125,000 bbl/d up to a maximum of the nominal 500,000 bbl/d. The minimum flow rates are based on operating only five pump stations as required to boost the flow over higher elevations such as the Beaumont, California, area and the Winchester Mountain pass in eastern Arizona. The higher flow rates require the use of additional pump stations

up to the total of 18 stations to overcome the pipeline frictional resistance.

The short-term flow rates would depend upon the number of pump stations and pumping units in operation as well as the crude oil temperature and viscosity. Considerable variation from the nominal 500,000 bbl/d would occur as a result of these viscosity variations depending upon the crude oil sources. As this is a common carrier line, it is possible other crude oil than Alaska crude may be transported through this pipeline. The station locations and pump designs at the pump stations would accommodate these variations.

The pumps at the harbor unloading terminal on Pier J would transfer oil to the Dominguez Hills terminal. Dominguez Hills terminal would be the initiating pump station. This would bring the pipeline, from these locations to the Redlands Pump Station, up to operating pressure and allow start-up of the Redlands station. Following in succession would be the pump stations of Ehrenberg, Coolidge, and Redington: This would establish a continuous flow rate into the Midland terminal. Once this was established, intermediate pump stations would be started and brought on stream in steps until all 18 pump stations were operating and full flow rate was established. Any desired lower flow rates could be obtained by reducing the flow rate out of the West Coast terminal and, if necessary, operating with fewer intermediate pump stations. The pump stations would be protected under abnormal operating conditions from excessively high or low pressures, by means of pressure control systems in each pump station. Data would be processed through the central computer as backup to monitor the individual pump station pressure controls. The choice would depend on the factors listed above.

Operations and maintenance of Midland terminal facilities

The proposed pipeline would terminate near Midland in an area presently occupied by operating tank farms. The terminal would receive oil from the pipeline, provide temporary storage, and serve as transfer point with custody transfer for crude oil entering existing pipelines designated for Midwest, East Coast and/or Gulf Coast refineries.

The operations at the Midland terminal would consist of pipeline receipts into tankage and pipeline transfers from tankage. Maintenance crews would be located at the Midland facility; however, the terminal would be controlled from El Paso.

A minimal maintenance team would handle routine maintenance and minor repairs. On major repair jobs, this team would be aided by personnel from the pipeline operating and maintenance centers.

The terminal would include a back-pressure valve for the main-line system metering stations for incoming and outgoing crude oil, tanks for temporary storage, and booster pumps for delivering oil to the distribution networks. The facility also would include communications and control systems for the terminal and pipeline operations.

Total storage capacity would be 2 million barrels for the daily throughput of 500,000 barrels.

1.2.3.4 Maintenance procedures

Principal management maintenance control would be headquartered at El Paso, Texas. The maintenance equipment and personnel responsible for the pump stations and the pipeline facilities for Texas and the New Mexico segments would be located at maintenance bases in El Paso and Lordsburg, New Mexico.

Personnel from these sections would provide support and coordination for maintenance and for major repair work at the Midland terminal.

Maintenance equipment and personnel responsible for pump station and pipeline segments would be located at Ehrenberg, Arizona, for western Arizona and at Casa Grande, Arizona, for eastern Arizona.

For pump stations and pipeline maintenance in California, equipment and personnel would be based in the Redlands and Ehrenberg areas and would be capable of supporting Long Beach Port/terminal personnel for major repair activities. None of the maintenance sites has been specifically identified by the applicant.

Routine maintenance would include the following:

1. Clearing and maintaining right-of-way with access trails.

2. Inspection and maintaining cathodic protection rectifiers.

3. Inspection and maintaining road-crossing markers.

4. Inspection of foreign crossings by other pipelines, highways, utilities, and other construction activities.

Aerial reconnaissance of the entire pipeline right-of-way would be made periodically by a contract service specializing in this function. Inspection schedules have not been set up by the applicants. The patrol plane would be equipped with a two-way radio tuned to the same frequency as the maintenance base station. Upon completion of the reconnaissance of a pipeline section, the pilot would report any activity observed on the pipeline. In the event of detection of a potential problem, such as unannounced construction activity or the detection of a suspected leak, the

pilot would report immediately. The nearest maintenance forces would be dispatched to inspect the activity.

Special safety precautions would be imposed on contract and other maintenance personnel which would provide appropriate safeguards for performing work in hazardous locations.

1.2.3.5 Abandonment of proposed system

"Abandonment" is a term normally used in the petroleum industry to mean that operation of a pipeline system would terminate, all of the product or commodity would be removed, and the equipment required to operate the system would be disconnected, dismantled, and possibly removed.

It is possible that conditions might develop where continued operation of the proposed oil transportation system would be economically impractical. If circumstances should develop, such as an insufficient supply of crude oil or an unforeseen economic situation, the SOHIO port, terminal, and pipeline operations would end. Termination of the operations would result in activities directed toward abandonment and disposal of all or portions of the entire system.

Short-term removal from service

At a future date, the proposed pipeline system may be temporarily removed from service as a result of acquisition by another firm with different usage requirements for the pipeline. In such a case, the pipeline would continue to be used, but might transport substances other than crude oil. Such a disposition would be facilitated by a transition procedure in which the firms involved would install the necessary equipment, and adapt the pipeline system accordingly. Abandoning the system, reversing the flow, and changing the type of product would require alterations.

Long-term removal from service

At some future date the proposed pipeline system might be temporarily removed from service as a result of temporary shortages of crude oil supplies or comparable liquids to be transported. Although the pipeline operations might be interrupted, the possibility of use in future would not be eliminated. In this event the facilities would likely be drained, preserved, and placed in a safe and inoperable condition, such as filling the system with corrosion preventative inhibitors and disconnecting the electrical sources.

Abandonment and disposal

At a future date, the proposed pipeline system might be taken permanently out of service and removed. If this condition should occur, the pipeline and its related facilities would be abandoned and disposed of. This would entail complete draining, disconnecting, and dismantling the entire system. All local, state, and Federal requirements would be met; all reports would document the preparations for a safe and efficient abandonment procedure as specified by technical, fiscal, and legal professionals.

Abandonment of Port facilities

Use of marine facilities and harbor modifications located at the Port revert to the Long Beach Port Authority, but the crude oil handling facilities would not be taken out of service unless specific arrangements were made with the Port Authority. The Port facility would include offshore assets such as the fixed berths, mooring and breasting dolphins, trestle, aids to navigation, mechanical unloading arms, piping, valves, berth to shore pipelines, communications and control equipment, and maintenance equipment. These items would be disposed of in a manner commensurate with the nature of each particular piece of equipment.

The crude oil remaining in the system would be drained into the nearest terminal facility, the equipment disconnected, sealed, and possibly removed for salvage.

West Coast terminal facilities

If the terminal facilities were to be abandoned, the work would begin by draining all of the combustible liquids from the oil-associated equipment. The crude oil would be collected in the crude oil drainage system at the terminal and transported, possibly by truck, to an operating pipeline system or refinery in the immediate area. Prior to opening or unbolting the tank connections, piping manifolds and pumping units, and all electrical sources would be disconnected and labeled as inoperable. Each component of the facility would then be cleaned and isolated or dismantled and removed.

The terminal facilities would include storage tanks, manifold piping, meters, valves, pumping units, waste treatment and disposal facilities, maintenance equipment, buildings, electrical control systems and substations, communications equipment, fire-fighting equipment, furniture, and miscellaneous tools. These items also would be disposed of in the most economical manner.

Storage and service tanks

All main storage tanks would be drained and individually isolated. All connections would be removed, then sealed by bolted flanges or plugs in such a manner as to leave visible the points of isolation. Particular attention would be given to isolating drains. Electrical circuits would be disconnected and isolated to prevent reconnection. Each tank would be cleaned by removing the bottom residues and purging the vapor spaces.

Standard safety precautions would be taken to ensure against ignition during cleaning and purging operations. After cleaning the vapor spaces in the

tank, connecting nozzles and flotation compartments of the floating roof would be thoroughly checked with combustible gas detectors and certified to be free of combustible liquids, vapors, and sludge.

Following such procedures, each tank would be in a condition suitable for extended removal from service, or for dismantling and final disposition. This procedure would include Pier J facilities and the Dominguez Hills terminal. The procedure for abandonment of ancillary facilities would coincide with the abandonment of the pipeline system, if the latter should take place. All ancillary facilities and equipment would be disassembled and would be disposed of in accordance with all local, state, and Federal requirements.

Manifold piping and valves

All piping systems in the terminal also would be drained into the crude oil drainage system for transport to an operating facility in the immediate area. All piping between valves would be isolated, and some valves would possibly be removed immediately for use elsewhere.

Precautions would be taken to ensure that no combustible material remained in isolated pockets of valve bodies or the piping. Temporary connections would be made, and flushing water would be circulated until the piping became substantially free of oil residue. After use, the flushing water would be processed through the terminal waste treatment system prior to disposal.

Piping and valves would be purged until certified to be free of combustible liquids, vapors, or residue, then sealed, and/or removed.

Methods of sealing would consist of welding or bolting steel plates on the open pipe ends and inserting plugs or cap screws on the small threaded piping.

Pumping units

Pumping units to be salvaged (pump and motor) would be totally disconnected, uncoupled, and removed for storage. Auxiliary connections to the pump suction and discharge piping would be cut and sealed below ground level and possibly removed. This would include electrical conduit, instrument piping, and drain piping. Piping previously containing combustible liquids or vapors would be flushed, purged, and sealed.

The below-grade equipment required for the vertical can-type booster pumps might be anchored and unsuitable for salvage. If the cans were not removed, each would be emptied, flushed, filled with soil, and covered with metal plates.

If the area occupied by the pumping units and associated equipment were designated for other uses, the below-grade equipment, as well as the foundations and piping, would be removed.

Sump systems

Sumps used for crude oil or oily water would be emptied and flushed with clean water. All connecting piping and conduit would be removed and sealed at or below ground level. Flushing water would be removed to the terminal waste water treatment system for disposal, and the sump systems would be filled with soil and covered.

Pipeline system

Abandoning the proposed pipeline operation would include the line pipe, main-line valves, pump stations, cathodic protection rectifiers, maintenance bases, and spare equipment. Major items in the pump stations would include the pumping units, electrical substations, control cubicles, scraper traps, and meters.

Pipeline displacement

Should it become necessary, the pipeline would be evacuated by displacing the crude oil with water. Pipeline cleaning equipment and scrapers would be inserted into the line and used to minimize the mixing action between the water and oil. Selected pumping units along the system would be used to gradually displace the crude oil and water into the Midland terminal. Also, if the water were removed from the line, elevation differences would require sectionalizing based on pump station locations, scraper trap facilities, and elevation. The water would be removed by truck transport to oil/water separators located in the immediate area. Retaining the water in the pipeline system, including the pump stations, would require adding a corrosion-protective inhibitor.

Line pipe and valves

Salvaging the line pipe would require construction activities similar to the installation phases of the pipeline system, but would be more localized. In certain areas, additional backfill might be required which would be hauled to the sites; likewise, other sections would not be salvaged, such as road crossings, railroad crossings, and possibly river crossings.

SOHIO would not be responsible for salvage of the entire pipeline system. SOHIO would lease the existing El Paso pipeline from Coronado Pipeline Company. Upon termination of operation of the pipeline facilities east of California, those portions of the existing pipeline would revert to the Coronado Pipeline Company who then would be responsible for any further use of the pipeline or for appropriate salvage activities at that time.

The pipeline corrosion system also would be disconnected and removed in the event of abandonment and disposal, but would remain in service if the system operations were terminated only for a short time.

Pump stations and maintenance bases

The main-line pumps, motors, control cubicles, piping, and valves could be removed for other usage if desired; or as an alternate, abandonment in place for an indefinite period of time could be accomplished by draining and filling the pumping units with an inhibitor, as well as disconnecting the electrical power.

Maintenance-base activities would be terminated, and the structures emptied of spare equipment and removed. In instances where the bases service other pipeline systems, some personnel would be retained.

Support facilities

The support facilities along the proposed project include buildings, vehicles, maintenance equipment, spare parts, fences, communications, and control equipment, and electrical equipment used for cathodic protection. These facilities would be taken out of service in a safe and efficient manner, and outstanding contracts would be allowed to terminate.

Under abandonment and disposition conditions, movable items would become available for sale or might be removed to salvage and reclamation points.

The communications system, consisting mainly of towers located at the pump stations and equipment cubicles, would be dismantled and sold unless another firm leased or purchased the equipment in place.

Midland terminal facility

The last stage of the termination and abandonment procedures would occur at Midland and would follow after the main pipeline had been completely evacuated of oil. The procedure for disposing of the terminal would be

similar to the West Coast terminal facilities because the proposed facilities would perform the same functions and would be nearly identical.

The schedule at Midland would depend upon the rate at which crude oil could be removed from the tank farm into existing pipeline systems.

Waste water treatment and disposal system

The waste water treatment and disposal system would continue operation until all flushing and cleaning work on the tanks, pipelines, valves, pumps and sump systems had been completed. Upon completion of these activities, this facility would continue to operate using fresh water for inlet until the system could be certified to be free of hazardous or combustible residue. The piping, valves, sumps, and pumps in this facility would be prepared in the manner described above for the terminal facilities.

Other items

Office buildings, furniture, electrical control and communications equipment, maintenance equipment, warehouse material, and miscellaneous tools would be disposed of as appropriate.

1.3 AUTHORIZING ACTIONS

The proposed project would require discretionary permits prior to construction from numerous Federal, state, and local jurisdictional agencies.

1.3.1 Federal Government

There are numerous agencies from which permits must be obtained by the applicant. Some of these agencies could require hearings in addition to those for the Draft Environmental Statement. Those departments and agencies are listed in Table 1.3.1-1. A discussion of the principal agencies follows.

1.3.1.1 Department of the Interior

The Department of the Interior has jurisdiction for permit actions on public lands withdrawn for reclamation purposes and on lands acquired for reclamation projects along the Colorado River.

In a similar permitting role, the Department of the Interior administers tribal trust lands of the Morongo and Agua Caliente Indian reservations.

The Department of the Interior must grant a permit for new construction over the pipeline route in, over, and across the Kofa Game Range in Arizona under 50 CFR, Part 29.

In addition to those lands and/or water areas directly administered by the Department of the Interior, the U.S. Fish and Wildlife Service, an agency of the Department of the Interior, has input to other Federal permits issued by the U.S. Army Corps of Engineers, as required by the Fish and Wildlife Coordination Act. Although an indirect action, it is a requirement of law that the Corps of Engineers, prior to permit action under the River and Harbor Act of 1899, consider information concerning fish and wildlife from the U.S. Fish and Wildlife Service.

The Bureau of Land Management (BLM) through the Secretary of Interior has permitting authority for pipelines under Section 28 of the Mineral Leasing Act of 1920, as amended (30 USC, 185), with the proviso that the pipeline,

Table 1.3.1-1

Federal Agencies or Agency Subdivisions Having Project Approval Requirements

DEPARTMENT OR INDEPENDENT AGENCY	Responsible Agency or Subdivision	Activity Requiring Approval	Form	Reference
U.S. Department of Agriculture	~~Forest Service~~	Pipeline construction across Coronado National Forest, Arizona	Special use permit	~~36 CFR 251.50, et seq.~~
	~~Forest Service~~	Road construction or use of any roads in Coronado National Forest, Arizona	Permit	~~36 CFR 212.10~~
U.S. Department of the Army	~~Corps of Engineers~~	Dredging of Port	Permit for work in navigable waters	~~33 CFR 209.120~~
	~~Corps of Engineers~~	Construction of breakwater docks at Port	Permit for work in navigable waters	~~33 CFR 209.120~~
	~~Corps of Engineers~~	Pipeline construction across Colorado River	Permit for work in navigable waters	~~33 CFR 209.120~~
	~~Corps of Engineers~~	Pipeline construction across Departmental lands	Easement	~~32 CFR 552.50, et seq.~~
Environmental Protection Agency		Transfer piping to service tanks	Permit to construct	Oil Pollution Prevention, 40 CFR 112
		Installation of service tanks	Permit to construct	New Source Review 40 CFR 52.233

Secretary of Interior

30 U.S.C. §185 (Supp. 1975)

Table 1.3.1-1 (Continued)

DEPARTMENT OR INDEPENDENT AGENCY	Responsible Agency or Subdivision	Activity Requiring Approval	Form	Reference
Environmental Protection Agency (Continued)		Transfer piping to storage	Permit to construct	Oil Pollution Prevention, 40 CFR 112
		Installation of storage tanks	Permit to construct	New Source Review, 40 CFR 52.233
		Disposal of dredge spoil	Permit	402 A1, Federal Water Pollution Control Act, 1972
		Wastewater discharges	Permit	33 CFR 209.120
Federal Communications Commission	Safety and Special Radio Services Bureau	Permit to operate microwave transmission towers	Notification of operation	Communications and Satellite Act, 1962, 76 Stat. 419; USC 701; 744
	Safety and Special Radio Services Bureau	Operations requiring extensive radio communications	License	47 CFR Chapter 1
Federal Power Commission		Termination of facilities or service	Filing	The Natural Gas Act, August 1, 1967, Subsection 157.18
U.S. Department of the Interior	Bureau of Land Management	Pipeline construction across public lands administered by the BLM	Permit	43 CFR 2800 and 2880 43 CFR 288 (pending)
	National Park Service	Pipeline construction crosses National Park land	Permit	36 CFR 5.7

Table 1.3.1-1 (Continued)

DEPARTMENT OR INDEPENDENT AGENCY	Responsible Agency or Subdivision	Activity Requiring Approval	Form	Reference
U.S. Department of the Interior (Continued)	Bureau of Reclamation	Pipeline construction across Irrigation Districts	Amended Easement	43 CFR 230
	Bureau of Indian Affairs	Pipeline construction across tribal, individually owned and Federally owned Indian lands on the Morongo and Agua Caliente Indian reservations, California	Easement	Rights-of-Way over Indian lands, 25 CFR 161
	Fish and Wildlife Service	Pipeline construction across Kofa Game Range, Arizona	Easement	50 CFR 291
U.S. Department of Transportation	Federal Aviation Administration	Permit to construct microwave transmission towers	Notification of construction	DOT 80 Stat. 932
	U.S. Coast Guard	Pipeline construction crossing navigable waters	Permit	33 CFR 115
	U.S. Coast Guard	Design and operation of private aids to navigation	Review/approval	33 CFR 66
	U.S. Coast Guard	Operation of marine facility	Operation approval	
	U.S. Coast Guard	Oil transfer operation between vessel and facility	Review/approval	33 CFR 126, 154, 156
	U.S. Coast Guard	Safe shipping practices	Review/approval	33 CFR 126, 30, 40

Table 1.3.1-1 (Continued)

DEPARTMENT OR INDEPENDENT AGENCY	Responsible Agency or Subdivision	Activity Requiring Approval	Form	Reference
U.S. Department of Transportation (Continued)	U.S. Coast Guard	Large oil transfer facilities	Approval	33 CFR 145
	Office of Pipeline Safety	Construction	Operation approval	49 CFR 191, 192, 193, 195
	Office of Pipeline Safety	Operation	Operation approval	49 CFR 191, 192, 193, 195
	Office of Pipeline Safety	Maintenance	Operation approval	49 CFR 191, 192, 193, 195
	Office of Pipeline Safety	Abandonment	Operation approval	49 CFR 191, 192, 193, 195
U.S. Department of State	International Boundary and Water Commission	Pipeline construction across Rio Grande, New Mexico	License	22 USC 277

whether it is used for oil or natural gas transport, must be a common carrier. These provisions are contained in 43 CFR, Subpart 2881, and include regulations for new right-of-way and changes in use from the purpose for which an original grant was made; i.e., in this case, the conversion from natural gas transport, east to west, to crude oil transport, west to east. Pump station sites may be granted under the same authority. BLM also handles permits for U.S. Forest Service lands, Fort Bliss Military Reservation, and the Kofa Game range where they are impacted by the proposals of this project.

Ancillary facilities to the oil transportation proposal are transmission lines, communication sites, water wells, haul or access roads, and possible materials sites. If all or any portion of these facilities are located on National Resource Lands administered by BLM or on any lands acquired from the United States (by purchase or otherwise), permits would be required under the Acts of 15 February 1901 and 4 March 1911 for communications sites and transmission lines.

Mineral materials disposals are authorized by the Materials Act of 31 July 1947 as amended by the Acts of 23 July 1955 and 25 September 1962. This includes such materials as sand, rock, and gravel. Permits for these materials on National Resource Lands are administered by the BLM State Director in each state affected or where the materials are sought.

Drilling any new water wells for construction-related purposes must also be permitted under regulations promulgated by the Secretary of Interior and contained in 43 CFR, Subpart 2920, for Special Land Use Permits.

Communications sites on National Resource Lands or other lands administered by an agency of the Department of the Interior are authorized by the Act of 4 March 1911, as amended. These can include access maintenance roads to the specific site required.

1.3.1.2 U.S. Army Corps of Engineers

The Department of the Army through the Corps of Engineers has discretionary permit authority under the following Acts to authorize work in navigable waters of the United States as well as other waters of the United States:

Section 10 of the River and Harbor Act of 1899 (30 State 1151, 33 USC 403) requires permits for structures and deposit of dredge or fill material in navigable waters of the United States. The Outer Continental Shelf Lands Act of 1953 (67 Stat 463, 43 USC 1333 [f]) extends the Section 10 authority to the limit of the outer continental shelf in connection with artificial islands and fixed structures. In addition, Section 103 of the Marine Protection Research and Sanctuaries Act (86 Stat 1052, 16 USC 1432) requires permits for the transportation of dredged material for the purposes of dumping in ocean waters. Also, Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (86 Stat 816, 33 USC 1344) requires permits for the discharge of dredge or fill material in all navigable waters of the United States and other waters.

1.3.1.3 Federal Power Commission

The operator of a facility involved in interstate transportation of natural gas must file an application with the Federal Power Commission (FPC) for abandonment of facilities or service, under Section 7 (b) of The Natural Gas Act, 1 March 1974 (18 CFR Section 157.18 - Applications to Abandon Facilities or Service). The reason for the filing is to show that sufficient facilities remain to service the market area. All activities relating to abandonment are the responsibility of the owner company. In this proposal, the foregoing would apply to abandonment of the 30-inch existing El Paso gas line. In regard to the pending application resulting from the proposed pipeline project, the FPC states the following:

"The scheduled timing for start-up of the SOHIO proposal to transport Alaskan crude oil from Valdez, Alaska, to Midland, Texas, is highly dependent upon El Paso Natural Gas Company (El Paso) receiving authorization from the Federal Power Commission (FPC) to abandon certain of its existing interstate gas transmission facilities. Pursuant to Section 7(b) of the Natural Gas Act, which states:

> [Section 7]
>
> (b) No natural gas company shall abandon all or any portion of its facilities subject to the jurisdiction of the Commission, or any service rendered by means of such facilities, without the permission and approval of the Commission first had and obtained, after due hearing, and a finding by the Commission that the available supply of natural gas is depleted to the extent that the continuance of service is unwarranted, or that the present or future public convenience or necessity permit such abandonment. [52 Stat. 824 (1938); 15 U.S.C., 717f (b)]

"Hearings are being held by the FPC. All aspects of the El Paso abandonment proposal are being analyzed, including those concerning the existing gas supply availability and the potential future gas supply additions to El Paso's system.

"El Paso has performed an analysis of the capability of its remaining gas transmission system, after the abandonment, to transport gas and render service, which sets forth eight "Cases" with respect to existing and potential future gas sources available to its gas transmission system. The eight "Cases" are as follows:

Case I -- Gas supplies available solely from presently dedicated sources.

Case II -- Gas supplies available from presently dedicated sources plus the gas available from the attachment of an additional 220 Bcf per year.

Case III -- Assumes Case II gas supplies plus the addition in late 1980 of 288 MMcf/d from El Paso's Burnham Coal Gasification Project in the San Juan Basin.

Case IV -- Assumes Case III volumes plus the addition of 400 MMcf/d available in the Permian Basin beginning in late 1982 from El Paso's Algeria II Project.

Case V -- Assumes Case IV volumes plus the use of El Paso's and Transwestern's systems to transport allocated quantities of Alaskan gas from the Permian Basin beginning in late 1982 under the FPC Staff's Arctic Gas displacement alternative set forth in its evidence at Docket Nos. CP75-96, et al.

Case VI -- Assumes Case IV plus 193.5 MMcf/d of Alaska gas at Ignacio, Colorado, to be transported by El Paso to the Arizona-California border for the account of Pacific Interstate Transmission Company as proposed at Docket Nos. CP75-96, et al.

Case VII -- Assumes Case III volumes plus Alaskan gas, beginning in 1982, available at the California-Arizona boundary from El Paso Alaska Company's proposal at Docket Nos. CP75-96, et al.

Case VIII -- Assumes Case I base volumes plus Burnham I, Algeria II, the Pacific Interstate transportation service of Case VI and additional production assumed for illustrative purposes to represent the impact upon El Paso's supply from the deregulation of producer wellhead prices.

"The FPC decision on whether to approve or disapprove El Paso's proposed abandonment of facilities would be contingent upon (among other things) an examination of the gas supply situation of El Paso's system. The FPC staff has analyzed the eight 'Cases' of gas supply possibilities to El Paso and has found that the gas supply reserve additions identified in Case II are reasonable and that there would be adequate capacity in El Paso's and Transwestern's gas transmission system, after the abandonment, to transport existing or anticipated future gas supplies, as identified in Cases III through VIII, westward."

1.3.1.4 Other Federal agencies

The Department of Transportation (DOT) has the jurisdiction for the regulation of new construction and specifications for existing pipelines as stated in Minimum Federal Safety Standards for Liquid Pipelines (49 CFR, Part 195). Standards for Gas Pipelines (49 CFR, Part 192) provide for the Abandonment or Inactivation of Facilities in Subsection 192-727. These regulations must be complied with during the development of the project. The DOT does not have environmental requirements which are pertinent to pipelines.

The Interstate Commerce Commission (ICC) regulates the establishment of rates for interstate transportation of crude oil by pipelines and required filing of proposed tariff structures. The ICC does not have regulatory jurisdiction over the construction of pipelines, and does not require that an Environmental Assessment Report be filed with them. However, recent proceedings have resulted in the opinion that the consumption and distribution of crude oil, as influenced by the ICC-approved rates, does have a significant effect on the quality of the human environment and would, therefore, be subject to the National Environmental Policy Act.

The Department of Agriculture through the U.S. Forest Service, has authorizing responsibility over lands proposed to be crossed by the pipeline in the Winchester Mountains in Arizona. In this proposal, a unit of the Coronado National Forest is involved.

Coastal navigational aids, in addition to the VTS proposed as part of the project, would have to be approved and permitted by the U.S. Coast Guard, an agency within the Department of Transportation.

1.3.1.5 Other Federal regulations and codes

The Federal regulations, standards, and codes which are applicable to the construction, maintenance, and operation of the SOHIO pipeline are identified in Table 1.3.1.5-1. The applicable references to be consulted in identifying pertinent regulations, standards, and codes are listed in the "code" column.

Table 1.3.1.5-1

Federal Regulations and Codes

FACILITY	Code
Port of Long Beach	American Institute of Steel Construction, Applicable Codes and Standards.
	American National Standard, ANSI B16.5 - 1973, Steel Pipe Flanges, Flanged Valves and Fittings.
	American National Standard, ANSI B31.4 - 1974, Liquid Petroleum Transportation Piping Systems.
	American Petroleum Institute, Standard 1104, 1973 Edition, Section 2, Qualification of Welding Procedure.
	American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Qualifications for Welding Procedure.
	American Society for Testing Materials, Applicable Codes and Standards.
	National Fire Protection Association, NFPA No. 30, Flammable and Combustible Liquids Code.
	U.S. Army Corps of Engineers, 33 CFR 209.120, Applicable Codes and Standards.
	Department of Transportation, Office of Pipeline Safety, 49 CFR, Part 195, Transportation of Liquids by Pipeline.
	Environmental Protection Agency, Title 40, Applicable Portions.
	Williams-Steiger Occupational Safety and Health Act of 1970.
	Oil Insurance Association Construction and Layout Recommendations and Fire Protection Recommendations for Oil Storage Tanks (Bulletin 400-2).
Dominguez Hills terminal	American Institute of Steel Construction, Applicable Codes and Standards.
	American National Standard, ANSI B16.5 - 1973, Steel Pipe Flanges, Flanged Valves and Fittings.
	American National Standard, ANSI B31.4 - 1974, Liquid Petroleum Transportation Piping Systems.

Table 1.3.1.5-1 (Continued)

FACILITY	Code
Dominguez Hills terminal (continued)	American Petroleum Institute, Standard 5L and 5LX, Specifications for Welded Steel Line Pipe.
	American Petroleum Institute, Standard 6D, API Specification for Steel Gate, Plug, Ball, and Check Valves for Pipeline Service.
	American Petroleum Institute, Standard 610, Centrifugal Pumps for General Refinery Services, Fifth Edition, 1971.
	American Petroleum Institute, Standard 650, Welded Steel Tanks for Oil Storage, Fifth Edition, July, 1973.
	American Petroleum Institute, Standard 1104. 1973 Edition, Section 2, Qualification of Welding Procedure.
	American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Qualification for Welding Procedure.
	American Society for Testing Materials, Applicable Codes and Standards.
	American Society for Testing Materials, Test Designation D 1557, 1970.
	National Electrical Manufacturers Association (NEMA), Applicable Standards for Electrical Motors.
	National Fire Protection Association, NFPA No. 30, Flammable and Combustible Liquids Code.
	Oil Insurance Association, OIA 631, General Recommendations for Spacing.
	U.S. Department of the Interior, 36 CFR 800.1, et seq., Survey, Preserve, and Protect Historic Sites or Structures.
	Department of Transportation, Office of Pipeline Safety, 49 CFR, Part 195, Transportation of Liquids by Pipeline.
	Environmental Protection Agency, Applicable Codes and Standards.
	Williams-Steiger Occupational Safety and Health Act of 1970.

Table 1.3.1.5-1 (Continued)

FACILITY	Code
Dominguez Hills terminal (continued)	Oil Insurance Association Construction and Layout Recommendations and Fire Protection Recommendations for Oil Storage Tanks (Bulletin 400-2).
Pipeline	American Concrete Institute (ACI).
	American National Standard Institute, American National Standard Code for Pressure Piping. Liquid Petroleum Transportation Piping Systems. ANSI B31.4 - 1974.
	Bureau of Reclamation, 43 CFR 230, Regulations Concerning Irrigation Works.
	Environmental Protection Agency, 39 CFR 16186, May 7, 1974, Effective October 15, 1974, and 39 CFR 37110, October 21, 1974, Statement of Policy and Procedures for Preparation of Environmental Impact Statements.
	Fish and Wildlife Coordination Act, 15 USC 661, et seq., 16 USC 61-66, 16 USC 472, 16 USC 551, and 42 USC 687, Construction Practices in Forest Service Lands or in National Forests.
	Institute of Electrical and Electronics Engineers (IEEE).
	Interstate Commerce Commission, 49 CFR Parts 1200, 1204, 1224, 1241, 1260, 1261, and 1262, Regulation of Interstate Common Carrier Crude Oil Pipelines.
	The Mineral Lands Leasing Act, 30 USC 181, et seq.
	U.S. Department of the Interior, 36 CFR 800.1, et seq., Survey, Preserve, and Protect Historic Sites or Structures.
	Department of Transportation, Office of Pipeline Safety, 49 CFR, Part 195, Transportation of Liquids by Pipeline.
	Williams-Steiger Occupational Safety and Health Act of 1970.
Main-line valves	American National Standard, ANSI B31.4 - 1974, Liquid Petroleum Transportation Piping Systems.
	American Petroleum Institute, Standard 6D, Specification for Pipeline Valves.

Table 1.3.1.5-1 (Continued)

FACILITY	Code
Main-line valves (continued)	Department of Transportation, Office of Pipeline Safety, 49 CFR, Part 195, Transportation of Liquids by Pipeline.
Midland terminal	American Institute of Steel Construction, Applicable Codes and Standards.
	American National Standard, ANSI B16.5 - 1973, Steel Pipe Flanges, Flanged Valves and Fittings.
	American National Standard, ANSI B31.4 - 1974, Liquid Petroleum Transportation Piping Systems.
	American Petroleum Institute 51 ds. 5L, 5LX and 5LS, Specifications for Welded Steel Line Pipe.
	American Petroleum Institute, Standard 6D. Specification for Pipeline Valves.
	American Petroleum Institute, Standard 610, Centrifugal Pumps for General Refinery Services.
	American Petroleum Institute, Standard 650, Welded Steel Tanks for Oil Storage.
	American Petroleum Institute, Standard 1104, 1973 Edition, Section 2, Qualification of Welding Procedure.
	American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Qualification for Welding Procedure.
	American Society for Testing Materials, Applicable Codes and Standards.
	American Society for Testing Materials, Test Designation D 1557, Latest Edition.
	National Electrical Manufacturers Association, Applicable Standards for Electrical Motors.
	National Fire Protection Association, NFPA No. 30, Flammable and Combustible Liquids Code.
	Occupational Safety and Health Act - Rules and Regulations, Federal Register, V1. 37, No. 202.

Table 1.3.1.5-1 (Continued)

FACILITY	Code
Midland terminal (continued)	U.S. Department of the Interior, 36 CFR 800.1, et seq., Survey, Preserve, and Protect Historic Sites or Structures.
	Department of Transportation, Office of Pipeline Safety, 49 CFR, Part 195, Transportation of Liquids by Pipeline.
	Environmental Protection Agency, Applicable Codes and Standards.
	Oil Insurance Association Construction and Layout Recommendations and Fire Protection Recommendations for Oil Storage Tanks (Bulletin 400-2).
Control systems	Electronics Industries Associations (EIA), Standard RS-232 (Latest Revision), Interface between Data Processing Terminal Equipment and Data Communication Equipment.
	Williams-Steiger Occupational Safety and Health Act of 1970.
Communications system	Electronics Industries Association,6; Standard RS-195 (Latest Revision), Electrical and Mechanical Characteristics for Microwave Relay System Antennas.
	Federal Aviation Administration, Advisory Circular 150/5345-43A and Specification L-856.

1.3.2 State agency actions

In addition to Federal authorizing actions, the states of California, Arizona, New Mexico and Texas require permits for various components of the SOHIO proposal.

1.3.2.1 State of California

The California Air Resources Board (CARB), under mandate from requirements of the Federal Clean Air Act of 1967 has, established air quality standards for the state through local Air Pollution Control Districts. Permits are issued in compliance with established rules and standards. If a given project does not or cannot meet these standards, a permit would not be granted. Aspects of the proposal which would require permitting include storage tanks, service tanks, unloading arms, pump stations, and possibly tankers while off-loading oil.

Permits would also be required for the proposed quarrying of rock at Catalina Island, the construction of the Port terminal facilities, the tank farm on Pier J and the pipeline or other facilities within 1,000 yards of mean high tide. This permit is required under the California Coastal Zone Conservation Act of 1972. This act expired on 31 December 1976. However, legislation has passed the California Legislature which extends the authority of the Coastal Commission for permit control until local plans have been certified as being consistent with the California Coastal Plan.

The California State Lands Commission must approve and permit pipeline and other facilities over lands and waters within its jurisdictional authority.

Pertinent to the El Paso Natural Gas Company pipeline abandonment application pending before the Federal Power Commission is the application for abandonment of the 30-inch Southern California Gas Company pipeline in California. This pipeline is exclusively within the purview of the California Public Utilities Commission permitting authority.

The California Public Utilities Commission is one of two agencies preparing the Environmental Impact Report as required under the California Environmental Quality Act. The other agency is the Port of Long Beach which is discussed in Section 1.4.2.3.

Water quality aspects of the proposal must meet specific discharge requirements as established by the Los Angeles Regional Water Quality Control Board for dredging, filling, disposition of hydrostatic test water, and disposal of water from dewatering construction trenches.

The California Fish and Game Department requires permits for marine construction and stream crossings under the California Fish and Game Code. It is expected that there will be 47 stream crossings if the proposal is implemented.

Fourteen new easements are required from the California Department of Transportation as well as 18 amended easements.

Clearance also will be needed from the State of California historical preservation officer.

1.3.2.2 State of Arizona

The Arizona State Lands Commissions has permitting authority over the State lands regarding rights-of-way or other uses of land or resources on State lands. Permits are required for the Colorado River crossings as well as land areas exclusively under the jurisdiction of the Arizona State Lands Department involving new construction of power lines, pump stations, pipelines, access roads, etc.

The Arizona Corporation Commission, Arizona State Contractors Office, and Arizona Department of Health Services also are involved in issuing licenses or requiring notification to the agency for doing business and operating in the state.

Arizona Department of Transportation requires permits to construct across state and U.S. highways within the state.

It will be necessary for the electric power companies to obtain a Certificate of Environmental Compatibility from the Arizona State Siting Commission prior to constructing certain transmission lines.

1.3.2.3 State of New Mexico

Six agencies of the state of New Mexico require permitting actions prior to construction and operation within the state. These are:

1. The Cultural Properties Review Committee.
Responsible for permitting pipeline construction across state lands having historical, archaeological or scientific value.

2. New Mexico State Lands Office Permits.
Required to construct and operate pipeline and ancillary facilities on state lands.

3. New Mexico Environmental Improvement Agency: Air Quality Division.
Permits for registration of the project as an air contaminant source, open burning of debris, and construction of pump stations as new contaminant sources.

4. New Mexico State Highway Department.
Permits for encroachment of construction upon state and interstate highways.

5. New Mexico Corporation Commission.
A license is required to operate the pipeline.

6. New Mexico State Engineer Office.
The removal of water for hydrostatic testing or other uses from underground basins or surface sources must be in accordance with State Engineer rules and regulations.

1.3.2.4 State of Texas

The state agencies requiring permit or licenses are:

1. Office of the Secretary of State.
Applicants must file for registration as a corporation.

2. Texas Department of Highways and Public Transportation.
Encroachment permits are required for pipeline construction affecting state highways. Also permits to operate oversize equipment on the state system.

3. Texas General Land Office.
Permits for easements across state lands are required for the pipeline right-of-way and ancillary facilities.

4. Texas Department of Health.
Permit required for water supply and sewage disposal involved with construction, operation, and maintenance of facilities.

5. Texas Historical Commission.
Permit required to conduct archaeological surveys.

6. Texas Park and Wildlife Department.
Permits required for stream bed material removal for pipeline construction.

7. Texas Railroad Commission.
Permit required for pipeline operations.

8. Texas Water Rights Commission.

Permit required for taking, diverting or appropriating public waters for pipeline use.

9. Texas Water Quality Control Board.

Permits required for discharging wastes into or adjacent to state waters.

10. Texas Air Control Board.

Permit required for construction of pump stations and the Midland terminal as stationary pollutant emission sources.

1.3.3 Other governmental units

In addition to Federal and state agency permitting actions, regional and local governmental agencies (counties and cities) with permitting actions under the various state building codes, zoning ordinances, general or special plan requirements must issue permits for construction and/or operation of the proposed crude oil transportation system.

Each regional and local agency with discretionary permit authority is authorized to issue permits upon request for start-up of construction activities.

1.4 INTERRELATIONSHIPS WITH OTHER POLICIES, PLANS, AND PROJECTS

The applicant's proposal for establishment of a crude oil transportation system is not limited to the transportation of Alaskan Prudhoe Bay production, but also considers the transportation of crude oil from "other West Coast sources" (Environmental Impact Analysis, Volume 1, Williams Brothers, 1976).

Other sources being considered for inclusion in the applicant's transportation system include: crude oil developed in southern California outer continental shelf reserves, or crude oil from the National Petroleum Reserve at Elk Hills, California.

The Coastal Zone Management Act of 1972 obligates Federal agencies to coordinate crude oil distribution programs, to the maximum extent possible, with Coastal Zone Management Programs of the coastal states which might be affected by such transportation and distribution.

Federal agencies are also required by congressional mandate to coordinate Federal projects with state or local plans and programs which might be affected by Federal actions. Particular concern is focused on offshore development of oil reserves and transportation or distribution systems in which onshore facilities, including both terminal construction or expansion, are required to transport or process the crude oil.

The following sections identify other plans and/or policies which must be considered in relationship to the SOHIO crude oil transportation proposal.

1.4.1 Federal Government

1.4.1.1 National Petroleum Reserve: Elk Hills, California

The U.S. Navy is mandated by Congress to develop and distribute crude oil from the National Petroleum Reserve at Elk Hills, California, by April, 1979. To distribute this expected 250,000 bbl/d, the Navy is considering three potential pipeline delivery systems:

1. Elk Hills to Port Hueneme, California, pipeline (includes port terminal facilities to further distribute crude oil by tankers).

2. Elk Hills to the San Francisco Bay area via pipeline.

3. Elk Hills to Redlands, California, via pipeline connecting to a 42-inch portion of the proposed SOHIO pipeline.

An Environmental Impact Statement on the transportation of Elk Hills reserves is being prepared by the Navy. The most desirable route presently appears to be the Redlands connection to SOHIO's proposed west-to-east pipeline. If the SOHIO line cannot be completed by April, 1979, a date to which the Navy is committed on the proposed Elk Hills project, it might become necessary to build a pipeline from Elk Hills to Port Hueneme, where tankers in the 50,000 DWT class would transport oil to San Francisco or Los Angeles/Long Beach Port facilities for distribution to existing local refineries.

Navy and SOHIO representatives have held preliminary discussions on the feasibility of the Redlands tie-in, but no firm commitments have been made.

1.4.1.2 <u>Other National Petroleum Reserves</u>

Should National Petroleum Reserve No. 4 on Alaska's North Slope become available for lease and development, a crude oil transportation system, in addition to the proposed SOHIO project, could well become necessary; i.e., conversion of a second southwestern line or employment of other alternatives such as foreign export, or the "Northern Tier" pipeline proposal from Port Angeles, Washington, to Clearbrook, Minnesota.

1.4.1.3 <u>Outer continental shelf</u>

As with Elk Hills oil production, it is conceivable that West Coast outer continental shelf (OCS) production could use the SOHIO Transportation Company proposed crude oil pipeline system for throughput of crude oil from the West Coast to Midland, Texas, where existing distribution systems would move the crude oil to points east, north or southeast.

Development of Federal leases offshore of California would involve coastal tanker traffic greater than the tanker mix assumed as reasonable for transportation of Prudhoe Bay crude oil to Long Beach. Vessels bringing offshore oil to Long Beach would be limited only by the berth design at the proposed Port of Long Beach terminal and not by water depth which is sufficient for large tankers.

Recent Federal action in leasing OCS tracts under Lease Sale 35 and the future possibility of tracts being leased under the provisions of OCS Lease Sale 48, where nominations have been called for along the California coast from Point Conception south (with the sole exception of Santa Monica Bay), would interrelate with the applicant's proposal.

Approval has been given and development is underway in the Hondo Field of the Santa Ynez unit. The project would involve a platform installed in 850 feet of water. Production would be connected to a single point mooring ship from which crude oil would be separated and transported by small tanker and/or barge to the developer's refinery. Production is expected to begin in early 1978, and transportation would be part of the tanker mix between the San Francisco and Long Beach coastal areas.

In addition, OCS Sale Number 39 in the Gulf of Alaska may relate to the proposed tanker traffic. The tracts are located immediately south and east of Prince William Sound. The significance of the OCS development program in relation to the SOHIO proposal depends upon the likelihood of finding and developing proven oil and natural gas reserves. Associated with this are activities that can interfere with normal shipping patterns. Typical operations include the positioning of floating platforms for drilling operations, the placement and use of fixed platforms for drilling and for services required for the production of these reserves, the use of floating or bottom-mounted storage tanks, the transport of oil by pipeline or tanker, and the increase in boat traffic used to service construction and operating personnel.

1.4.1.4 Ongoing Bureau of Land Management planning

Concurrent with the development of the Environmental Statement for the SOHIO proposal, the Bureau of Land Management is developing a conservation plan for the California desert through a project team located in the BLM Riverside, California, district office. In addition, each BLM state and district office (California, Arizona, New Mexico) has or is developing functional Management Framework Plans for National Resource Lands. These plans are based on an interdisciplinary approach involving recreation, open space, range, vegetation, wildlife, watershed, minerals, and land uses under the myriad of public land laws applicable to BLM administrative jurisdiction.

Potential impacts of this proposal relative to the BLM planning process would be identified and evaluated by the authorized officials based on this environmental document. Further planning would be accomplished under provisions of the Federal Land Policy and Management Act of 1976 (Organic Act).

1.4.2 State of California

The various resource agencies of the State of California each have plans and/or policies affecting both public and private land and water use. These plans or policies are either in effect at present or are anticipated to be in effect at the time the applicant would propose to begin construction.

1.4.2.1 California Coastal Conservation Plan

By referendum ballot on 7 November 1972, Proposition 20 (California Coastal Zone Conservation Act) mandated that a California Coastal Conservation Plan be developed and delivered to the Governor and State Legislature by 1 December 1975. Ensuing coastal legislation was developed which closely followed the Federal Coastal Zone Management Act in its conservation

philosophy. Legislation was passed to adopt California's Coastal Zone Plan and was inaugurated on 1 January 1977. California's Coastal Plan has been approved by the Office of Coastal Zone Management, U.S. Department of Commerce, indicating that Federal grant funds for coastal program implementation will be available, as well as funds from recent supplemental appropriations respective to the outer continental shelf reserve development.

1.4.2.2 Other California programs

In addition to the Coastal Zone Conservation plan, several other state programs interrelate with the proposed project.

State Lands Commission -- oil and gas leasing. An active program has been underway respective to developing offshore and onshore oil and gas reserves under the jurisdiction of the California State Lands Commission. Activity from existing leases extends from offshore areas south of San Pedro Bay to the Santa Barbara offshore area. The State Lands Commission has exclusive jurisdiction over state tidelands, extending seaward to the 3-mile limit.

California Parks and Recreation Department. This agency has, as part of its planning program, several underwater preserves established in coordination with the Fish and Game Department. State legislation has been passed establishing a coastal conservation fund which would provide for public acquisition of beaches, uplands, estuaries, bays, sloughs, or lagoons with significant coastal ecological or recreational attributes.

California Department of Navigation and Ocean Development. The department has an established program of funding recreational boating marinas. This policy is especially important in southern California because of the desirable climate and the large recreational boating public.

These plans and programs are not intended to be all inclusive, nor limiting. The purpose of inclusion in this document is to take note of other existing programs potentially impacted by interrelationships with the proposed project.

1.4.2.3 City and county plans and programs

In addition to state agencies plans and policies, coastal and inland counties and cities in California have existing general plans with recently added elements on scenic highways, noise, seismic conditions, and open space and conservation, as required by state law. The State Office of Planning and Research is the coordinating and advisory unit for the state on these plans as submitted by local planning authorities.

As stated under Section 1.3, Authorizing Actions, the proposed project must conform to these plans and implementing ordinances or obtain a variance from local authorities in conjunction with permit issuance.

One specific program is the Bicycle and Equestrian Trail Parkway planned jointly by the City of Long Beach and Los Angeles County for the Los Angeles River flood control channel. This program could be implemented and constructed prior to action on the proposal by SOHIO, indicating potential conflicts unless closely coordinated with local planning agencies.

Several water-oriented projects have been proposed within San Pedro Bay by the Port of Long Beach and Port of Los Angeles. Most of these projects are increments of the respective general plan developments for the ports. The Port of Los Angeles prepared an environmental assessment on its general plan, and the Port of Long Beach distributed a draft EIR on its general plan in August, 1976.

A proposed Federal project to upgrade the utility of the Port of Los Angeles has been studied by the U.S. Army Corps of Engineers. This upgrading would

be accomplished by deepening the channel and turning basin areas within the harbor, and creating new land in the outer harbor. The deepened channels would allow larger general cargo and container ships. New lands would be used as future sites of modernized facilities for container, dry and liquid bulk, and energy terminals. A cutter-head hydraulic suction dredge would dredge 10 million cubic yards of harbor bottom. Harbor depths would be increased from -35 feet reference mean lower low water (MLLW) to -45 feet MLLW. Unpolluted dredge material deposited in the outer harbor would create approximately 190 acres of new land. Construction would probably begin a few years after completion of the SOHIO project. A final EIS for the proposed Federal project was distributed in October, 1974 by the Los Angeles District, Corps of Engineers.

The Port of Los Angeles has a proposal to build liquid natural gas (LNG) receiving facilities by further dredging and filling operations. The intended Port customer would bring LNG ships from Cook Inlet, Alaska, to the Los Angeles facility. The first phase of the project would have 200-million cubic feet per day (cf/d) capacity, and the second phase, 400-million cf/d capacity. The possible ultimate capacity is 4 billion cf/d.

The newly created land from this project would be used for cargo storage, container handling facilities, and liquid and dry bulk transfer facilities. The new land area would comprise 330 acres and be located in the outer harbor. A cutter-head hydraulic suction dredge would be used to remove 16 million cubic yards of material from 450 acres of harbor bottom. Of the 16 million cubic yards, 6 million are required for the LNG terminal. The remainder are for general harbor expansion. Depths in the dredge areas would change from largely the -20-foot to -35-foot range to new depths of -45 feet MLLW. The Port of Los Angeles has planned construction to take place at about the same time as SOHIO terminal construction. Many governmental approvals would be required before construction could begin. The Port of Los Angeles completed a final EIR on the project in February,

1976. A draft EIS for the project, "Cook Inlet-California Project," was completed by the Federal Power Commission in September, 1976.

The Port of Long Beach proposes to upgrade its utility and capacity by dredging and landfill. The proposed dredging depths and locations are shown in Figure 1.4.2.3-1. The figure also shows the landfill location immediately south of Pier J (landfill part of the Port of Long Beach Master Plan, not part of SOHIO project). The dredging locations comply with the general plan for the port, and this project must be considered an increment of that plan. A hopper dredge would be used to remove 11 million cubic yards of material. All unpolluted material would be used toward creating the 110 acres of new land. Polluted material would be dumped at an EPA-approved ocean site. The Port's construction time frame would probably be close to, and immediately after, the SOHIO terminal construction. Although no EIR or EIS has been completed, permit application has been submitted to the Corps of Engineers.

The City of Long Beach has a less-developed plan for a small-boat marina somewhere north of Pier J. The marina would have approximately 1,000 boat slips. Several alternative locations and configurations prevent further description of this project.

1.4.3 Other states

The states of Arizona and New Mexico, through which the pipeline passes, also have plans which may interrelate with the project.

1.4.3.1 Arizona

For several years, Arizona has been experiencing critical groundwater shortages in certain areas as a result of withdrawals of groundwater that exceed natural recharge capability. Arizona has declared several areas as "critical," and placed curtailment on drilling of new source wells for

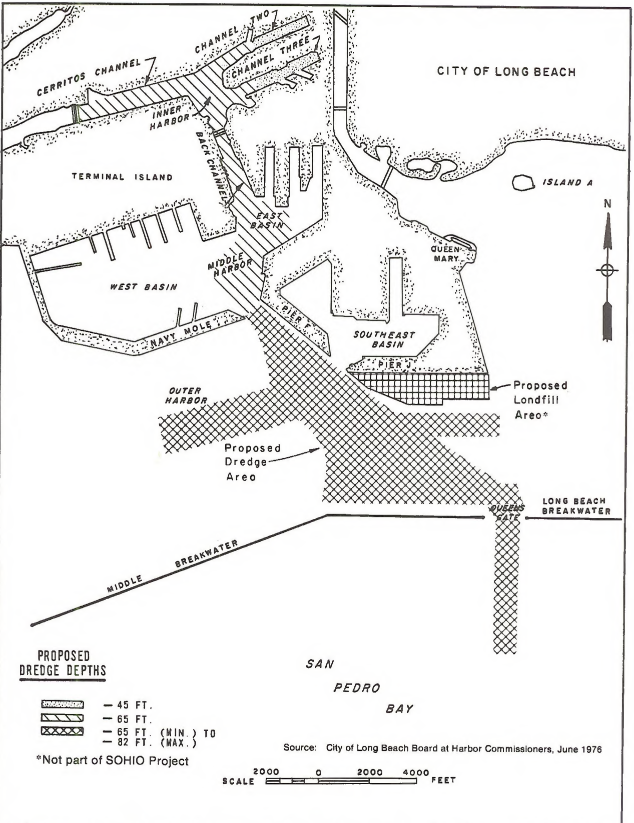


Figure 1.4.2.3-1 Proposed dredging area, depths, and landfill locations in Port of Long Beach area

irrigation and other commercial purposes. This program, or declaration of new critical areas, could have potential impacts on the availability of water for the proposed project in Arizona.

In addition, the State of Arizona is vitally concerned with the progress of the Central Arizona Project, a water delivery system from the Colorado River at Parker to the Phoenix and Tucson area. The system route, if it is implemented, would be crossed by the proposed project pipeline alignment in some areas.

Arizona, in addition, has sought from the applicant a commitment of delivery of crude oil to supply a refinery in Arizona. At present there are no plans and no applications for a refinery in Arizona.

1.4.3.2 New Mexico

A request for crude oil delivery has been made by the State of New Mexico. Again, no project or project sponsor to develop a refinery in New Mexico has been identified.

1.4.3.3 Texas

There are no known plans or programs to which the proposed project would relate.

1.4.4 Private industry

Other dedicated trans-Alaska pipeline vessel traffic. Transportation of 2 million bb/d of the TAPS crude oil from Valdez to the markets of the lower Pacific coast states would require a total tanker capacity ranging from 3.1 million to 3.4 million DWT. SOHIO is expected to supply about 1.34 million DWT capacity. The balance would come from the other companies that share in the pipeline production. The most recent information reflecting the

composition of this fleet was presented at a meeting of the Pacific Oil and Ports Group in January, 1976, at San Diego. The results are summarized in Table 1.4.4-1.

The characteristics of the fleet would be similar to those of the SOHIO fleet previously described. Tankers that have been built prior to 1976 do not carry sufficient segregated ballast to meet regulations of the International Marine Consultative Organization (IMCO) or the U.S. Title 33 CFR, Part 157, nor do they have other features intended to enhance safety or environmental protection (U.S. Dept. of Transportation, 1976). On those that are planned or are now under construction, features such as segregated ballast, inert gas systems, and collision avoidance plotters will be included.

Spur pipelines. There are five taps located on the existing 669.4 miles of El Paso Natural Gas Company transmission line that deliver to five grantors of pipeline right-of-way. Pending approval by FPC, if this gas transmission line is converted to crude oil service, these taps would be disconnected and plugged.

There are eight taps located on the existing 118.3 miles of Southern California Gas Company transmission line. If this gas transmission is converted to crude oil service, these taps would be disconnected and plugged.

There would be a pipeline spur that would tie into the main-line system to withdraw 200,000 barrels of crude oil per day for distribution to the southern California refineries. This spur tie-in would be located at the Dominguez Hills terminal.

Tentative discussion by interested parties in New Mexico has indicated a desire for a spur tie-in on the main pipeline for a potential refinery site.

Table 1.4.4-1

Projected TAPS Tanker Fleet

OWNER	Dead Weight	No.	Total Capacity	Year Built	IMCO Seg. Ballast	33 CFR-157	Double Hull/Bottom	Inert Gas	Loran-C	Collision Avoidance System
ARCO	120,000	3	360,000	73-75	No	No	No	No	Yes	Yes
	150,000	2	300,000	77-79	Yes	Yes	Dbct.	Yes	Yes	Yes
CHEVRON	70,000	3	210,000	71-72	No	No	No	No	Yes	No
EXXON	70,000	2	140,000	65-66	No	No	No	No	Yes	No
	76,000	3	228,000	69-70	No	No	No	No	Yes	No
MOBIL	130,000	1	130,000	72	No	No	No	Yes	Yes	No
SHELL	188,500	2	377,000	77-78	Yes	Yes	Dbot.	Yes	Yes	Yes
SOHIO[a]	80,000	4	320,000	70-71	No	No	No	No	Yes	No
	120,000	3	360,000	76-77	Yes	Yes	Dhull	Yes	Yes	Yes
	165,000	4	660,000	76-79	Yes	No	No	Yes	Yes	Yes
TOTALS		27	3,085,000		11	7	7	12	27	14

Source: Pacific Oil and Ports Group Meeting, 16 January 1976.

[a] Reflects information furnished 26 July 1976.

A spur tie-in from the U.S. Navy Elk Hills crude oil system to the SOHIO Transportation Company pipeline in the Redlands area is being considered.

Spur transmission lines. The only spur transmission lines in this statement were identified in Section 1.2.3.2.

Projects proposed or under study. Several contemporary projects are being considered by private industry which would interrelate with the proposal, as presented, in terms of energy and environmental scope.

Proposed liquefied natural gas (LNG) tanker transport -- Three major proposals to transport liquefied natural gas by cryogenic tanker to southern California for regasification and distribution are currently being considered for approval. If agreed upon, each proposal would add to the current vessel traffic density of the area. If all proposals were to be approved, future vessel traffic patterns could become significantly altered. Two proposals are concerned with the transportation of the natural gas recovered from Alaska. The El Paso-Alaska System proposal aims at using Point Gravina and Point Conception as the respective loading and receiving terminals. The Pacific Alaska LNG company proposal seeks to transport natural gas recovered in the Cook Inlet, using as its terminal points Nikiski and the Los Angeles Harbor. The third major proposal to be discussed involves an application on the part of the Pacific Indonesia LNG Company to import liquefied natural gas from Indonesia to Oxnard.

The El Paso System alternative consists of the following components: A natural gas pipeline would carry gas from Prudhoe Bay, Alaska, southward to Gravina Point on Prince William Sound, Alaska. At Gravina Point, the natural gas would be liquefied and then loaded into 165,000-cubic-meter LNG carriers for shipment to the receiving and regasification facilities to be located at Point Conception, California. Twelve carriers would be used. Upon reconversion, the natural gas would be transported to Arvin, California, where a portion of it would be introduced into existing

pipelines for distribution eastward. The remaining portion would be transported via new pipeline to existing transportation facilities at Cajon, California.

The Pacific Alaska LNG Company proposes to construct at Nikiski, Alaska, the necessary facilities to process and ship ultimately 400 million cubic feet (11.2 million cubic meters) of natural gas per day from the Cook Inlet area to meet the demands of the southern California market. The liquefied natural gas would be delivered by two cryogenic tankers to the proposed Western LNG Terminal Company facilities in the Los Angeles Harbor area. After vaporization, the gas would be delivered to SOCAL, an affiliate of the applicant, and used in its public utility system.

The current Pacific Indonesia LNG Company proposal is to import approximately 546 million cubic feet (15.3 million cubic meters) daily of Indonesian liquefied natural gas to be processed at the Western LNG Terminal Company proposed facility at Oxnard and sold to the Southern California Gas Company for use in its existing public utility system.

Sun Desert Nuclear Plant -- As proposed by San Diego Gas and Electric Company, the plant would be located south of Blythe, California, with transmission lines crossing the desert from the plant in the same general geographic area as the proposed pipeline.

Vidal Nuclear Power Plant -- A proposed nuclear generating station of about 1,540 megawatts would be located a few miles east of Vidal Junction, California, and across the Colorado River from Parker, Arizona.

Palo Verde Nuclear Plant -- The Palo Verde Nuclear Generating Plant is licensed and presently under construction. The first unit is expected to be on line early in 1982. The Final Environmental Statement was issued by the Nuclear Regulatory Agency in September, 1975.

Greenlee County, Arizona, to El Paso, Texas, 345 kv Transmission Line -- Public Service Company of New Mexico applied for rights-of-way to the Bureau of Land Management for construction of two 345 kv transmission lines eastward from a Tucson Gas and Electric Company substation in Greenlee County, Arizona (following a route near the existing pipeline corridor) across New Mexico to El Paso, Texas. The Bureau of Land Management's Final Environmental Statement on this proposal was approved and permits issued in 1976.

1.4.5 Future plans of SOHIO (possible addition of second line)

The SOHIO Transportation Company has indicated the possibility of a second phase for the project, which would involve abandonment of a second 30-inch gas pipeline generally paralleling the route of the proposed pipeline.

It is anticipated that if this second pipeline were converted, the throughput of crude oil transported to the mid-continent could increase from the projected 500,000 bbl/d. A new environmental assessment would be necessary.

REFERENCES

Chapter 1

1. ERT, Inc. 1976. Air Quality Impact of the Proposed SOHIO Tanker Fleet on Port Valdez, Alaska. ERT, Inc., Westlake Village, CA.

2. SOHIO Transportation Co. of California. 1976. Pers comm., Los Alamitos, CA.

3. Williams Brothers Environmental Services. 1976. West Coast - Mid-Continent Pipeline Project, Environmental Impact Assessment. Prepared for SOHIO Transportation Co. Williams Brothers, Tulsa, OK.